





RANDOM RECORDS OF A LIFETIME
DEVOTED TO SCIENCE AND ART, 1846-1931

BY W. H. HOLMES

VOLUME VIII

1897-1902

- Section I Cuba and Jamaica with Langley and Powell.
The Flying Machine. 1900.
- Section II Trip to California with McGee. 1898.
- Section III Visit to Mexico with Dutton and Gilbert,
guests of Mr. Breckenridge, 1899.
- Section IV Organization of the Division of Physical
Anthropology, Ales Hrdlicka appointed
Curator.
- Section V Current Archeological Work.



A charming sketch by Winslow Homer, print-

RETURN TO WASHINGTON FROM CHICAGO.

In 1897 I had the great good fortune to secure my release from the Curatorship of Anthropology in the Field Columbian Museum, Chicago, and to return to Washington, taking up again the Head Curatorship of the Department of Anthropology in the National Museum. The return to Washington was due largely to the friendship and good management of Dr. Charles D. Walcott, who had just become Assistant Secretary of the Smithsonian Institution. The change was the outcome of a series of differences with Director Skiff of the Field Columbian Museum. He assumed to direct the scientific work without even a smattering knowledge of what it was or should be. He had the backing of the Museum Directors, Higgenbotham, Field and the rest, who knew nothing of the requirements of the Museum and its staff beyond what Skiff chose to tell them. It was a most aggravating and hopeless situation for me, and to most of the staff for that matter. Skiff's attitude toward me was doubtless due in part to jealousy, due to his fear that I was undermining him with the view of becoming Director.

THE HISTORY OF THE

REIGN OF KING CHARLES THE FIRST

BY SAMUEL JOHNSON

IN TWO VOLUMES

LONDON: Printed by A. MILLAR, in Pall-mall, 1720.

THE SECOND VOLUME

CONTAINING THE HISTORY OF THE

REIGN OF KING CHARLES THE FIRST

FROM THE DEATH OF KING CHARLES THE FIRST

TO THE DEATH OF KING CHARLES THE SECOND

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THE SECOND VOLUME

CONTAINING THE HISTORY OF THE

⑤ TRIP TO CUBA AND JAMAICA, MARCH

Powell and I had a trip in Cuba in February and Langley joined us later in Jamaica to study the buzzard.

MEMORANDUM.

Routes.--Plant line steamers sail x from Tampa via Key West to Havana every Monday, Thursday and Saturday at 11 p. m. Take Southern Railway leaving Washington Saturday, Tuesday and Thursday at 9:50 p. m. Two days on train.

Florida East Coast steamers leave Miami for Havana on Sunday and Wednesday. Take Southern train leaving Washington on Saturday and Tuesday at 11:15 a. m.

Cook's Excursionist, pages 27, 28, etc., give sailings of vessels.

Personal.--In Havana call on Governor-General Leonard Wood and on Col. Black and Gen. Ludlow, ex-district commissioners of Washington.

Route.--Inquire at Havana for vessels for Santiago or for Kingston, Jamaica. Go to former if practicable by rail to Batabano, immediately south of Havana, or through the center of Cuba via Matanzas to Cienfuegos. Vessels sail from Batabano and Cienfuegos for Santiago and Jamaica.

Personal.--At Santiago look up Major MacLery, who was of the Adjutant General's office and say you are introduced by Robt. T. Hill. Also Major James Shelly of the Rural Police. Shelly used to be on the Geological Survey. Also Mr. Ziegfuss, Mngr. of Iron Companies. Lives at The Palms. Will take you on his railways everywhere.

February 13, 1900.

My dear Mr. Holmes:

Secretary Langley will leave Philadelphia March 1, on the fruit line steamer Admiral Schley for Port Antonio, Jamaica, where he will arrive in about four days. He will remain in Jamaica about ten days, and probably return via Santiago, Havana and Tampa.

He has asked me if I knew anything about the plans of yourself and Major Powell, and suggests, in case your trip is to end at the same time, that it would be very nice to come back together. I am quite sure you intend staying longer, and yet it may be in your scheme to

visit Jamaica, and you may find it convenient to be there when Mr. Langley is. Of course, he cannot tell now what his movements will be about the island, but I could let you know in ample time.

Please write me as soon as you receive this letter, and at least tell me enough of your plan to enable the Secretary to know something of your whereabouts during the early part of March. Should our letters fail to connect properly, I would suggest your writing Mr. Langley, care of the Admiral Schley at Port Antonio, so that your letter may reach there by March 4.

Be good enough, please, to give my best regards to Major Powell, and say

that I hope the tropical climate is
doing him much good.

Yours very truly,

Richard Rathbun

Professor William H. Holmes,
Kingston, Jamaica.

0 *A copy sent to Puerto Rico.*

TRIP TO CUBA WITH MAJOR POWELL
AND TO JAMAICA WITH SECRETARY LANGLEY

1900

In February and March, 1900, I had a charming trip to Cuba and Jamaica with Major Powell, the purpose being to study the collections of aboriginal antiquities preserved in island museums and in other collections, and to carry on such researches as would be possible in the few weeks that could be spared for the purpose.

The trip was made by way of Tampa and Key West to Havana, Cuba. We were armed with letters of introduction -- official, financial and personal, and reached Havana on February 11. I may quote a letter written to Mrs. Holmes, describing our visit:

"In the morning early we are off for Matanzas where we shall spend a day and then go on to Cien Fuegos and then by boat to Santiago. Colonel Scott, who has been so attentive to us goes with us to see the caverns near Matanzas. Last night we dined with Scott, who is now acting Governor of the city, and met there several officers most of whom have been over the Rocky Mountain country and we had many stories and a very jolly time.

"I think I told you how we visited one wonderful fortress back of the city and yesterday through the kindness of Colonel Scott, we had a look into ^{el} old Morro and the Cabanas,

a fortress prison half a mile in length which overlooks the city from across the narrow entrance to the bay. Today I went back to sketch one of the views in Cabanas which I think is the most superb landscape subject of its general class in America. A picturesque color mottled castle fortress set on green cliffs with a background of the most wonderful blue sea. It was so hot that I had to give it up, but I got enough to work from when I get home.

Picture of the fortress

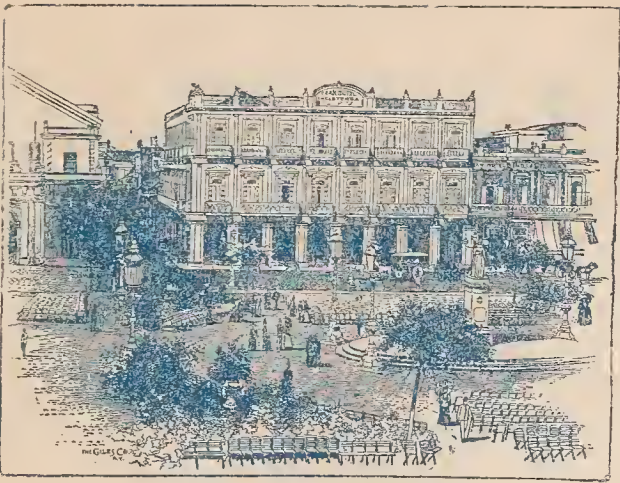
I got several kodaks. I could spend a month here there is so much of interest. It is a great and wonderful city and I hope we can do something to put it in under civilized government.

Did I tell you that we had a very pleasant interview with General Wood? He is a strong man. * * *

The several other points visited are as follows: Kingston, Matanzas, Cien Fuegos, Mandeville, Montego, Port Antonio, Halberstadt (visited here the caves described by Durden which were found to contain small accumulations of fossil bones), Constant Springs, and Port Antonio, the point at which the Buzzard was to be studied.

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the peoples have included two great linguistic stocks -- the
Arawack and the Carib. Both are believed to have been derived
from South America. The former had practical possession of .



J. F. VILLAMIL
PROPIETARIO.

Gran Hotel Inglaterra

I shall hope to hear from you at
Kingston.

Habana, Cuba Feb 11th de 1900.

My Dear Kate

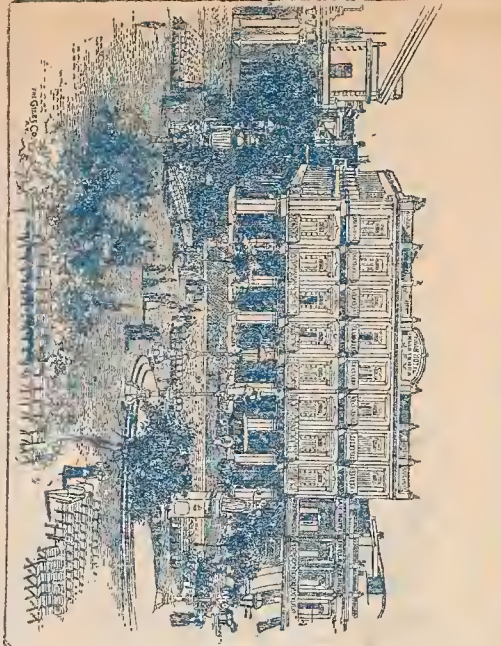
I sat down thinking I would write to you all and began with William. It is so dark here, the gas being poor that I think I will stop with you and let Dee hold over until later. In the morning early we are off for Matanzas where we shall spend a day and then go on to Cien Fuegos and then by boat to Santiago. Colonel Scott, who has been so attentive to us goes with us to see the caverns near Matanzas. Last night we dined at the ~~city~~ ^{house} who is now acting governor of the city, and then there several officers most of whom have been over the Rocky mountain Country and we had many stories and a very jolly time.

I think I told you how we trailed our wonderful fortresses back of the city and yesterday through the kindness of Col Scott, we had a look into old Morro and the Cabanas, a fortress prison half a mile in length which overlooks the city from across the narrow entrance to the bay. To day I went back to sketch one of the views in Cabanas which I think is the most superb landscape subject of its general class in America, a picturesque color mottled castles set on green cliffs with a background of the most wonderful blue sea. It was so hot that

My dear Mr. [illegible]
I have just received your letter of the 10th inst. and am
glad to hear that you are well. I am at present in
the city and have not time to write you more fully
at present. I will write you again when I have
more leisure. I am, dear Sir, very respectfully,
Your obedient servant,
[illegible]

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open sea between
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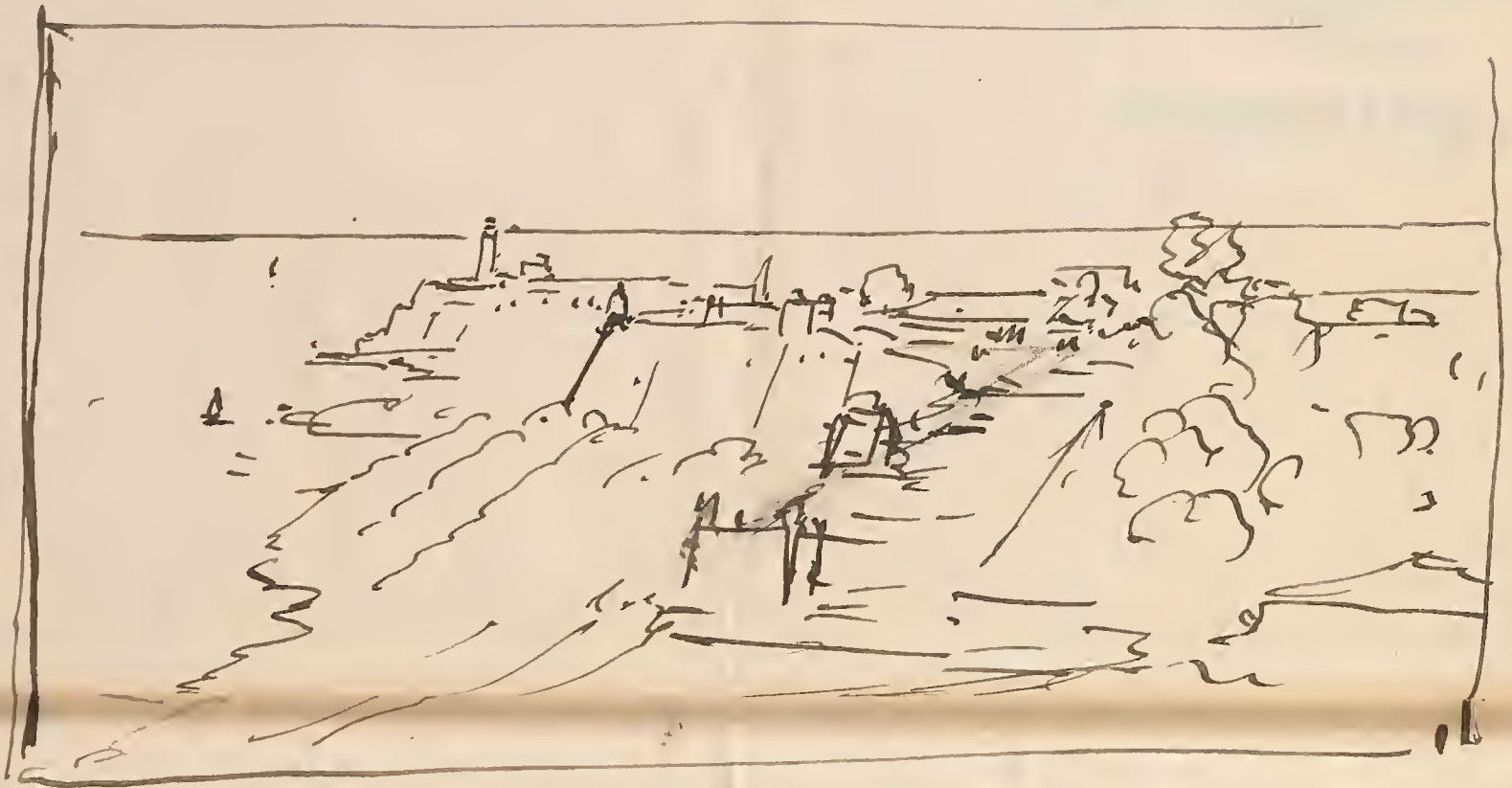
J. F. VILLAMIL
PROPIETARIO.

Gran Hotel Inglaterra

Sabana, Cuba
de 1900.

the peoples have included two great linguistic stocks -- the Arawack and the Carib. Both are believed to have been derived from South America. The former had practical possession of

that I had to give it up, but I got enough
to work from when I get home. There



I got several Kodaks. I could spend a
month here there is so much of interest. It
is a great & wonderful city and I hope
we can do something to put it in under
civilized government.

Did I tell you that we had
a very pleasant interview with General Wood?
He is a strong man. ||

I have gathered up a good deal of in-
formation that will be of use to me & the Museum.
We have been here only four days - but
it seems like a month. Sometimes I am a
little homesick.

With love to you & small Town
Bill

Handwritten text, likely a list or ledger, written in cursive script on aged paper. The text is organized into columns and rows, possibly representing a table or account book. The handwriting is somewhat faded and the paper shows signs of age and wear.

THE WEST INDIES.

The West Indies present a most attractive field of research for the archeologist -- a field as yet touched upon only superficially save for the recent researches of Doctor Fewkes. The archipelago stretches out over upwards of 1600 miles of open expanse, the Lesser Antilles connecting somewhat closely with South America, and through the Bahamas with Eastern Florida. The greatest expanse of open sea between South America and the Lesser Antilles is that separating the Island Tobago from island, a distance of 80 miles, the distance between the Bahamas and the Florida coast not exceeding 60 miles, and Yucatan is 120 miles from the west extremity of the Island of Cuba and within historic times the peoples have included two great linguistic stocks -- the Arawack and the Carib. Both are believed to have been derived from South America. The former had practical possession of

the islands in immediate prehistoric times but the latter were rapidly encroaching upon their territory and threatened their extinction at the period of discovery. Whether the Arawacks were preceded by any other earlier race or stock is still a question since no well identified traces of such antedecendent population have been found. The entire culture presents somewhat uniform characteristics and corresponds more closely with the culture of South America than with that of Florida or Yucatan, the break between these later regions and the islands being very pronounced.

Of the material evidences of culture the islands furnish no architectural remains and few traces of other works. Relics of stone, baked clay, shell, and bone, are, however plentiful and widely distributed. The use of metals was apparently very limited. No very decided centers of culture have been observed although greater advancement seems to have been made in Santo Domingo and Porto Rico than elsewhere. Articles

of stone comprise not only implements and utensils in large numbers, and well made, comparing well with the corresponding forms in the southern states but several classes of sculpture of remarkable characteristics and of undetermined use save that it may with safety be regarded as pertaining to religious beliefs and practices - the fiducial phases of their culture. Most noteworthy among these relicts are the collars or yokes the tri-pointed stones and the masketts, well made mealing stones and receptacles of stone are not rare, and pestles and elaborately carved and beautifully finished celts, chisels, axes, and hammers are present in some sections in remarkable numbers. Chipped implements are of rare occurrence.

Explorers of the West Indies include IM Thurn, ten Kate, Ober, Branch, Montaine Duerdin, Fewkes, and others.



Smithsonian Institution

PRESIDING OFFICER
EX-OFFICIO

The President of the United States.

CHANCELLOR

The Chief Justice of the United States.

ALL CORRESPONDENCE
SHOULD BE ADDRESSED
TO THE SECRETARY.

S. P. LANGLEY

UNITED STATES NATIONAL MUSEUM.
INTERNATIONAL EXCHANGES.
BUREAU OF ETHNOLOGY.
NATIONAL ZOOLOGICAL PARK.
ASTROPHYSICAL OBSERVATORY.

Washington, February 1, 1900

To the friends of the
Smithsonian Institution.

I have the honor to introduce to you
Mr. William H. Holmes, Head Curator
of the Department of Anthropology in the
United States National Museum, who is
traveling in the West Indies upon official
business. Any courtesy that you may
be able to show him will be highly appreciated.

S. P. Langley
Secretary



*General Scott got me a card
to visit Ed. Morris, see letter
to Morris Holmes*

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Handwritten text in the upper middle section, possibly a subtitle or a specific heading.

Main body of handwritten text, consisting of several lines of cursive script.

Handwritten text at the bottom left, possibly a signature or a date.



Charles C. Glover, President.
Thomas Hyde, Vice President.
James M. Johnston, 2^d VPrest.

NO 5046.
CAPITAL \$ 500.000.

Arthur T. Brice, Cashier.
Wm. J. Flather, Asst. Cash.

The Riggs National Bank of Washington, D.C.
(formerly RIGGS & CO.)

Washington, D.C. Feb. 2, 1900. 189

The North American Trust Co.,

Havana, Cuba.

and

Messrs. De Ford & Co.,

San Juan, Porto Rico.

Gentlemen:-

This letter will introduce to you Professor William H. Holmes, of the Smithsonian Institution, in Washington.

Professor Holmes goes to Cuba and Porto Rico on business connected with the Institution, and we commend him to your courtesy and consideration. He carries our seven drafts on the Bank of America, New York, for Fifty Dollars (\$50.) each, numbers 35,103 to 35,109 inclusive, payable to his order. We will thank you to cash any or all of these drafts for Professor Holmes, in case of need, and, as a means of identification, refer to his signature at the foot of this letter.

Very truly yours,

Arthur T. Brice

Cashier.

BRICE

Signature of

W. H. Holmes

THE UNIVERSITY OF CHICAGO

LIBRARY

1917

THE UNIVERSITY OF CHICAGO

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LIBRARY

1917

War Department,

QUARTERMASTER GENERAL'S OFFICE,

Washington,

Feb. 6, 1900.

To all

Quartermasters,

of Cuba and Puerto Rico.

Gentlemen :

By direction of the Quartermaster General you will please furnish transportation, on any Army transport, around the Island of Cuba or Puerto Rico for Major J. W. Powell, and Professor W. H. Holmes of the National Museum, who are visiting these islands to carry on scientific investigations for the Government.

This transportation will only be furnished to points where the Army transports make regular stops, and when the same will not interfere with the transportation of military persons or supplies.

Respectfully,


Major and Quartermaster U.S.V.

116428

February 19, 1900.

Dear Mr. Holmes:

Your letter from Havana to the Secretary, giving such a good account of the Major's health, was very welcome, and made us all feel good. I hope his progress will be rapid and the cure complete.

I am writing now only to say that the Secretary still hopes you may be in Jamaica while he is there. This is not official, nor would the Secretary wish you to change your plans on his account, but as he has spoken more definitely of his trip since I wrote you last, I thought I would tell you about it.

He will leave New York (D. V.) on March 1, on the steamer Admiral Schley, which goes to Port Antonio. Mr. and Mrs. Arnold Hague are to be his companions on the trip down. Hague will take up some geological problems in Jamaica, and the Secretary expects they will soon part company. The latter now expects to remain perhaps 10 days in Jamaica, or until about March 15, and it would be of real enjoyment to him if he could be with you and the Major.

From Port Antonio he could reach you by railroad wherever you happened to be. I have suggested that he go on to Puerto Rico, but he says he has not the time.

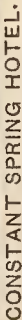
Wishing you all success in your
trip, believe me,

Sincerely yours,

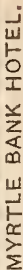
Richard P. Pithers

Professor William H. Holmes,
Kingston, Jamaica.





MYRTLE BANK HOTEL,
KINGSTON, JAMAICA, W. I.,

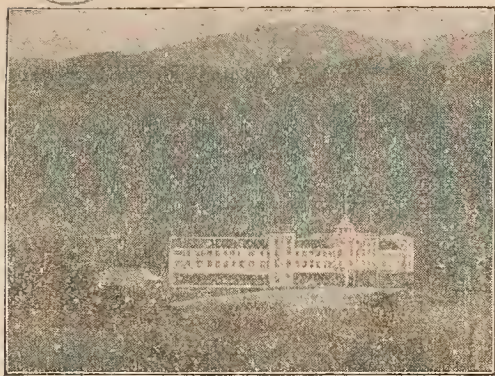


My Dear Kate

Feb 24th 1900

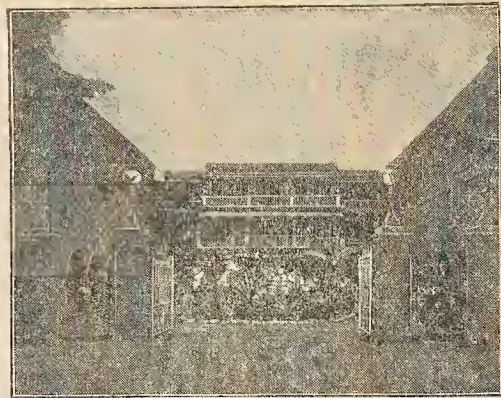
Line and

B. S. Gossett Esq.,
Halterstadt,
Bull Bay P.O.



CONSTANT SPRING HOTEL.

CONSTANT SPRING COMPANY.
 PROPRIETORS OF
 CONSTANT SPRING HOTEL
 AND
 MYRTLE BANK HOTEL.



MYRTLE BANK HOTEL.

MYRTLE BANK HOTEL,
 KINGSTON, JAMAICA, W. I.,

Feb 24th 1900

My Dear Kate

I had planned to write you a long and interesting (?) letter to night on the events of the last few days and on the charming islands of Jamaica, but I am just in from a long hot trip in the country, when I have been looking up an old Indian shell mound, but I am tired and soaked with perspiration and hence in no good plight for literary effort: — so I shall leave off until morning

Sunday morning.

This is a large and airy hotel with no sort of verandahs shaded by graceful palm trees which shake their plumes like a graceful bird over

(2)

as the trade wind comes in from the sea. we are
in the City but on the shore of the bay and a
few ships lie nearby. all of these, British
Americans and the rest were gay with bunting -
The stars & stripes above all - when we came into
the harbor on Washington's birth day. It seems
quite like home to see these things and hear the
salutes expressive of good will toward our country.
But the English of these people is hardly better
than the Spanish of Cuba. It is a funny Cockney
dialect modified by the thick lips of the African.

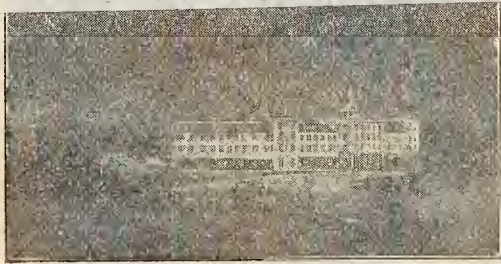
The island is black - awfully black - 600,000 colored
to 14,000 white, and one sees little but Africa
on the streets. Yesterday was market day and
there were sights to be seen. I spent part of
the forenoon Kodaking in the market. For

a dozen blocks the streets were a mass of picturesque people - nearly all women for there are nearly two women to one man on the island - buying & selling. From morning until night the roads to the country are literally crowded with the picturesque women, tall, barefooted & black bearing loads upon their heads or leading heavily laden donkeys. There must be 10,000



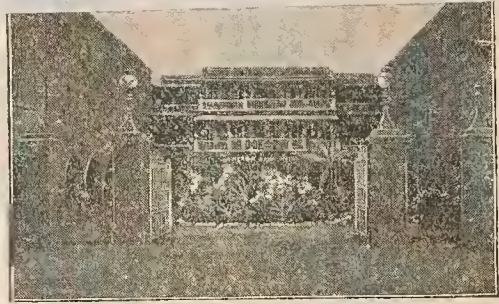
Back view of woman
on the way to market

and
Donkey



CONSTANT SPRING HOTEL.

CONSTANT SPRING HOTEL.
AND
MYRTLE BANK HOTEL.



MYRTLE BANK HOTEL.

MYRTLE BANK HOTEL,
KINGSTON, JAMAICA, W. I.,

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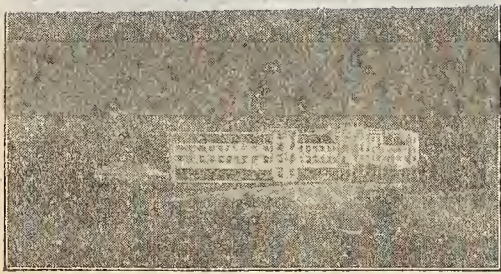
(4)

of these women bridge with town and out in
one day. I was out seven miles yesterday
and the roads were full of them, there and
some came from 20 miles out.

The hills rise about 7 miles back from
the bay and are steep and lofty rising
to 7000 feet. The foliage is fresh and
beautiful and the Coconut palm, seen
everywhere, is artistic and lovely. I have
not sketched much yet as there is too
much to see and do.

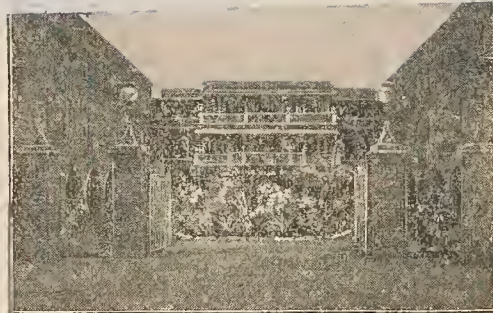
I was awfully glad to have two letters
from you and to have the one from Hatch.

It is certainly flattering that all three of



CONSTANT SPRING HOTEL.

CONSTANT SPRING HOTEL.
AND
MYRTLE BANK HOTEL.



MYRTLE BANK HOTEL.

MYRTLE BANK HOTEL,
KINGSTON, JAMAICA, W. I.,

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(23)
my pictures were hung. I will write
Hatch a note today.

We left picturesque Santiago without
regret - but found the voyage over here on
a freight steamer most unpleasant. Max
was sea sick and although I was not
fully sick I feel the effects of the churning
and the beastly smells yet.

I wish you could be here a little while
not long - for there is no place like home -
Cold max this morning may only abate and
desire now was to get back to the land of
~~fat~~ sweet butter and real cream.

I rather expected to hear from the boys
here but they are too busy to write I suppose.



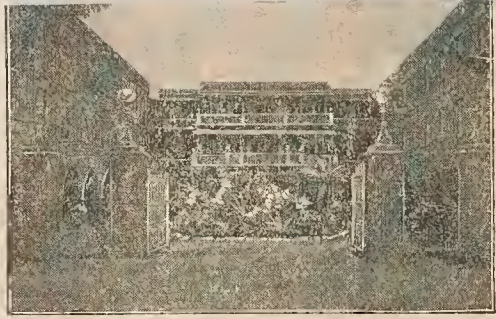
CONSTANT SPRING HOTEL.

OWNERS PROPRIETORS OF

CONSTANT SPRING HOTEL.

AND

MYRTLE BANK HOTEL.

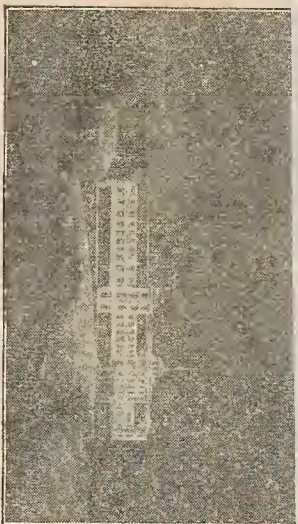


MYRTLE BANK HOTEL.

MYRTLE BANK HOTEL,
KINGSTON, JAMAICA, W. I.,

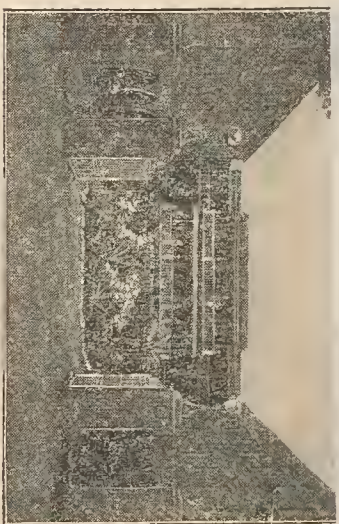
Feb 23rd 1911

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CONSTANT SPRING HOTEL.

OWNERS
 PROPRIETORS OF
 MYRTLE BANK HOTEL.
 AND
 MYRTLE BANK HOTEL.



MYRTLE BANK HOTEL.

MYRTLE BANK HOTEL,
 KINGSTON, JAMAICA, W. I.,

Oct 23rd / 19.

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THE INSTITUTE OF JAMAICA

*For the Encouragement of Literature,
Science and Art.*

KINGSTON, JAMAICA,

26th February 1900.

(Copy)

Dear Mr. Gosset:

Professor William Holmes, Head Curator of the Anthropological Department of the United States National Museum, Washington is very anxious to visit the Halberstadt Cave. He proposes to do so on Saturday. I have suggested that he should leave Kingston at 6 a.m., by which means he would get to Halberstadt at least by nine.

If you will not be there yourself, will you kindly arrange so that someone will meet him on the road, say a balarama, to show him the cave; and arrange afterwards for his refreshment.

By doing this you will greatly oblige

Yours very truly,
(Sgd) Frank Cundall
Secretary.

B. S. Gosset Esq.,
Halberstadt
Bull Bay P.O.

Mauderille Monday March 11 1902

FRANK D. LAMBLEY

Dear Mr. Holmes.

The Major has been troubled by his cold and wished to return this morning but after a better night, he concludes to stay another day the place being cool and restful, though so devoid of incident that I don't think he will care to remain.

I shall be (probably) in Kingston or Constant Springs for a week and desire to occupy myself with the study of the flight of the Barnards (John Cr.)

I want to get some young man to help me, not necessarily a scientific man but an intelligent fellow who knows the place and speaks good English and could write from dictation. Please leave at the Myrtle Beach the name of the Secretary of the ^{Local} Institute or of the Correspondent of the Smithsonian, first asking if you will be so good if with

Can suggest such a man.

I would gladly be indebted also
to you for some help in this connection.

Having your camera always with
you I should value any pictures
you might take of a burraird. near
enough to show the disposition of
the wings and the end feathers
which lie separate when soaring.

Any will be welcome, more especially
those taken near to, when the bird
is in the act of turning or swinging
round, which it does every other
minute.

If you will add in,
each case, a memorandum of the
direction of the wind relative to the
line of sight (i.e. the optical axis) of
your camera this will be most useful.

The Major says you know a very
good photographer in Kingston. will
you see if he can help in this.

(for a fee of course.) and
leave me his address.?

Be kind enough to keep
this letter and to return it to
me at Washington

I rather think I shall
find the Major disposed to
return tomorrow or next day.

I will ask you - by the
way - to be good enough to see
whether my "hold-all" which
the Hotel/Porter took back to
the Hotel to wait my return,
but for which I have no check
is duly marked for my account.

With apologies for the
trouble I may be giving and
with kind regards I am
Yours very truly
S. Langley

W. H. Holmes Esq
1410 14th St. N. Washington

S

SMITHSONIAN INSTITUTION
WASHINGTON, D. C.

ALL CORRESPONDENCE
SHOULD BE ADDRESSED
TO THE SECRETARY

S. P. LANGLEY.

May 17, 1900.

Personal

Dear Mr. Holmes:

Your Mr. D. F. Murphy's printed communication argues a good deal of careful and intelligent observation on the "John Crow", (more indeed than I had expected), but it is combined with an ignorance of the fundamental principles of the subject. He is, I think, in error in his letter, in saying that it will be impossible to photograph these ^{movements} with advantage:—it is nearly impossible now, with the present apparatus, to do more than you have already done, but I am, as I think I told you, arranging for a twin pair of simultaneously acting cameras, which will give every element of the bird's position at every observation.

I shall be pleased to see this Mr. Murphy when he comes; and as to the proposed cameras, if the subject

continue to interest you, I trust you will speak to Mr.
Smillie against our next journey down the river under, I
hope, better conditions than the first one.

Very truly yours,

S. P. Langley
Secretary.

Mr. W. H. Holmes,

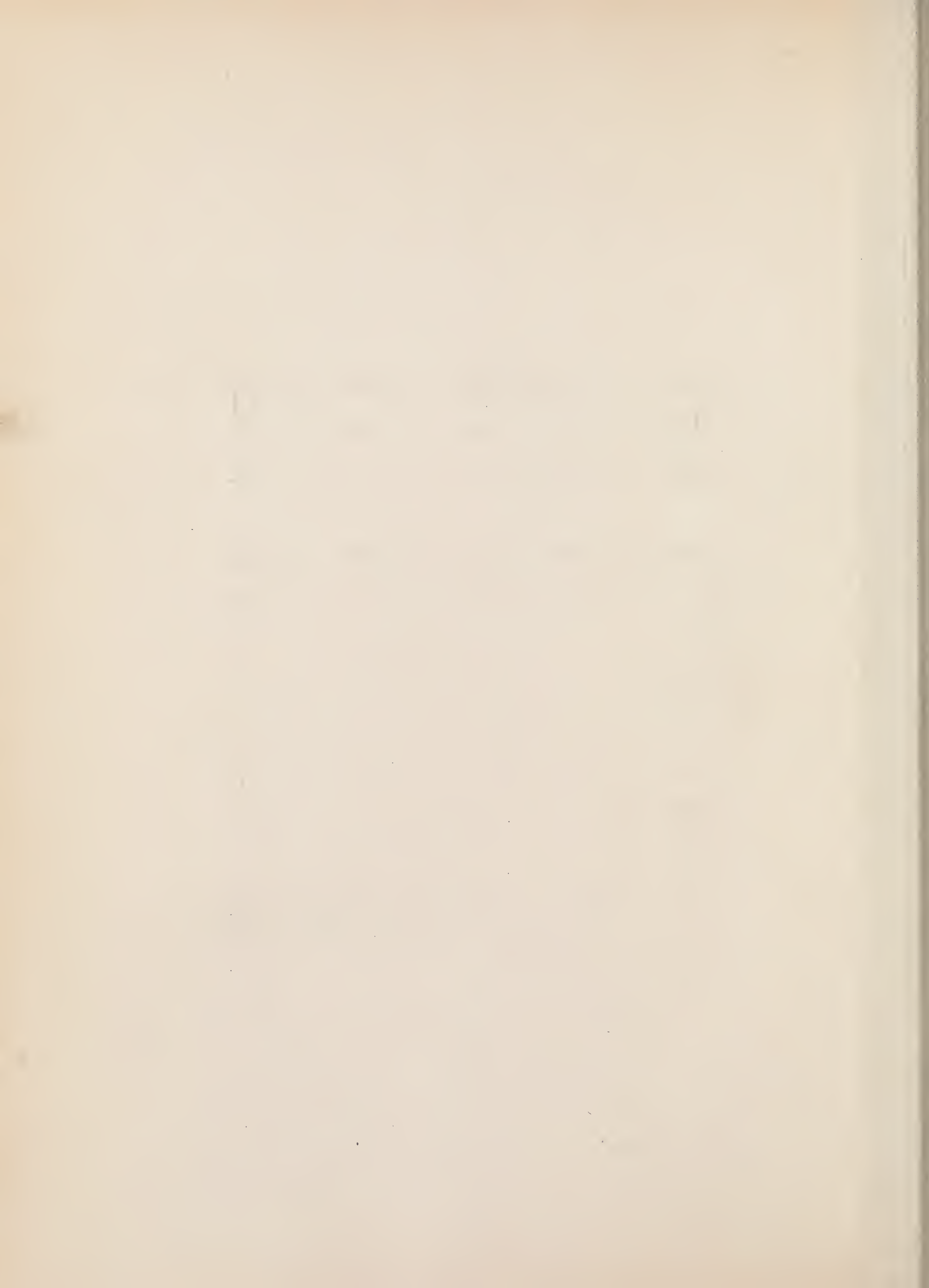
Smithsonian Institution,

U. S. National Museum.

W-P



Palms at hotel in Havana.



TRIP TO CUBA AND JAMAICA WITH SECRETARY LANGLEY
AND MAJOR POWELL.

1900

Early in 1900 I had a charming trip to Cuba and Jamaica with Major Powell, the purpose being to study the collections of aboriginal antiquities preserved in island museums and in other collections, and to carry on such researches as would be possible in the few weeks that could be spared for the purpose.

The trip was made by way of Tampa and Key West to Havana, Cuba. The several points visited are as follows:

Kingston

Matanzas

Cien Fuegos

Mandeville

Montego

Port Antonio

Halberstadt (visited here the caves described by Durden which were found to contain small accumulations of fossil bones.)

Constant Springs

Port Antonio was the point at which the Buzzard was to be studied.

Major Powell's reference to our trip in the 1900, *p. XL* Annual Report of the Bureau of American Ethnology, is as follows:

"In the course of a reconnaissance of the Greater Antilles, the Director and Professor Holmes enjoyed moderate opportunities for observing (chiefly in local collections)

artifacts of the class commonly regarded as displaying traces of Caribbean influence; and while neither time nor opportunity permitted exhaustive study, a few interesting generalizations were made. One of these relates to the relative abundance of esthetic and industrial motives among those artifacts displaying traces of a southern influence. When the objects and special features were compared with those from Florida and other portions of southern United States, it was noted that the presumably imported or accultural features are predominantly esthetic, and only subordinately of technical or industrial character -- that is, it would appear from the collections that esthetic motives travel more freely, or are interchanged more readily, than purely utilitarian motives among primitive peoples. The relation is of course complicated by the relative abundance of fiducial or other sophic motives, which often blend with both esthetic and industrial motives in puzzling fashion; but even after these motives are weighed or eliminated, the general relation remains unchanged. The generalization promises to be of service as a guide in the study of that affiliation of tribes, or integration of peoples, which complicates every ethnologic problem. The Director's inquiries were greatly facilitated by Professor Holmes' artistic training and his extended familiarity with both the esthetic and the industrial motives of aboriginal artifacts; nor could the generalization have been made without the aid of Mr. Cushing and the opportunity of examining his remarkable collection of artifacts of wood and shell from the muck beds of western Florida, of which a considerable part is now in the National Museum."

STUDY OF THE TURKEY BUZZARD IN JAMAICA, MARCH 1900,
BY DR. LANGLEY WITH THE VIEW OF LEARNING THE SECRETS
OF FLIGHT. ASSISTANCE GIVEN BY W. H. HOLMES.

"Several persons connected with the Smithsonian Institution and U. S. National Museum have contributed towards securing the results herewith submitted. Among them, I desire especially to mention Mr. W. H. Holmes, Mr. F. A. Lucas, Mr. N. R. Wood, and Mr. R. L. Reed. Mr. Holmes superintended the experiments in connection with No. 6 (finding the bird's center of gravity), and by his suggestions and criticisms helped me in many other particulars. The photographs and enlargements were made by Mr. T. W. Smillie.

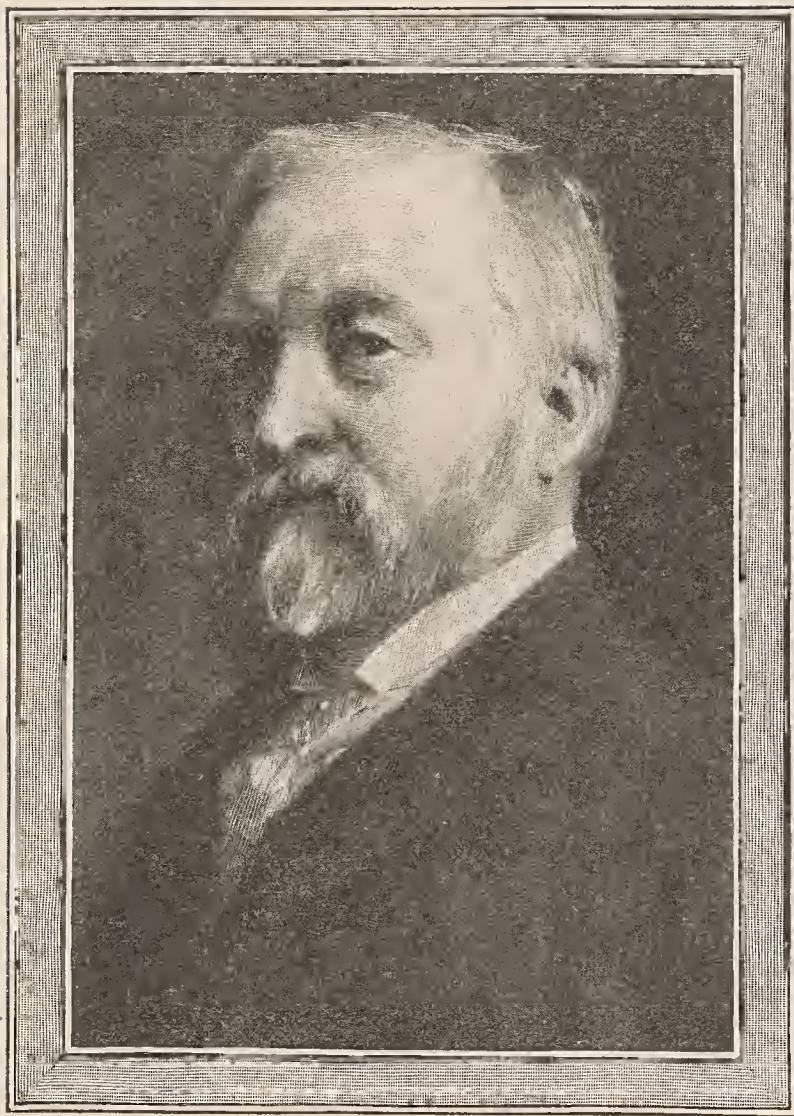
Respectfully submitted

ROLLA P. CURRIE

Aid, Division of Insects, Acting in the
Division of Birds.

October 16, 1900"

(Royal quarto volume the "Langley Memoir of Mechanical Flight," page 292)



PROFESSOR S. P. LANGLEY.

From the painting by Robert Gordon Hardie, 1893.

TRIP TO CUBA AND JAMAICA WITH SECRETARY LANGLEY
AND MAJOR POWELL.

Early in 1900 I had a charming trip to Cuba and Jamaica with Professors Langley and Powell, the essential purpose of the trip being the study of the Turkey Buzzard or "John Crow," Prof. Langley hoping to learn something to aid him in the construction of the flying machine which at that period engaged his attention.

The points visited may be mentioned:

Feb. 4- Reached Tampa, Florida.

" 6- Key West.

" 7- Havana.

" 8- Kingston.

" 12- Matanzas.

" 13- Cien Fuegos.

" 14- Mandeville.

" 28- Montego.

Mar. 1- Montego.

" 2- Returned to Kingston.

" 3- Port Antonio.

" 3- Halberstadt - Visited the caves described by Darden, which are merely small depositories of fossil bones.

See S. I. report for 1900

Mar. 10 - Constant Springs.

13 - Mandeville.

14 - Mandeville.

19 - Port Antonio, the point at which the Buzzard,
was to be studied.

When we arrived at the local hotel, I obtained measuring instruments and we began the study of the odoriferous bird. With the help of the natives specimens were easily caught by throwing out rats with looped cords, so that when they lit to pick up the rats, their feet were caught in the loops.

Measurements were made with much detail as indicated in my sketch. A large specimen was then, with the cord attached to his one foot, allowed to rise from the ground with a view of observing the movements of his wings, - photographs were made to complete the record. In order to observe the movements of the bird in taking flight from an elevated perch we tied dead rats to strings again and threw them out the second story window to the shed beneath. The buzzards soon picked up the rats and turning began their flight with a little effort, photographs and sketches being made for record.

Mr. Langley has made a report on his observations published in —

When our work was completed we packed up our belongings and returned to Kingston, Port Antonio and began our report.

Observation 1 - Buzzard started fully two minutes exactly facing a strong wind horizontally and with only a little wavering and tilting, then moving around circled with the wind. No change in position of tail, wings, head or feathers. The wind strong and steady.

See Kodak. The bird being 50 feet away and 20 feet facing wind and tilted at an angle of 45 degrees.

Observation 2 - Bird set steady and directly against strong wind horizontally with slight wavwrings, $1\frac{1}{2}$ minutes and then turned and sailed away with the wind.

Kodak 2. Bird 40 feet away and 30 feet up rising gradually and passing over.

Numerous other observations and kodaks were made but the record from now serves no purpose.

Examples of my drawings herewith.

Buzzard Measurements and Weights.

John Crow.

Length--66 inches.

Weight-- $2\frac{3}{4}$ pounds.

Weight of Body- $1\frac{1}{4}$ pounds. (Estimated)

Weight of One Wing - $\frac{3}{4}$ pound (Estimated)

Area of One Wing - 300 square inches.

Whole Area - 710 square.

Width between shoulders - 2 inches.

Width of free cuticle on upper arm $1\frac{1}{2}$ inches.

Length of upper leg - $4\frac{1}{2}$ inches.

Length of lower leg and foot - 6 inches.

Length of tail - 11 inches.

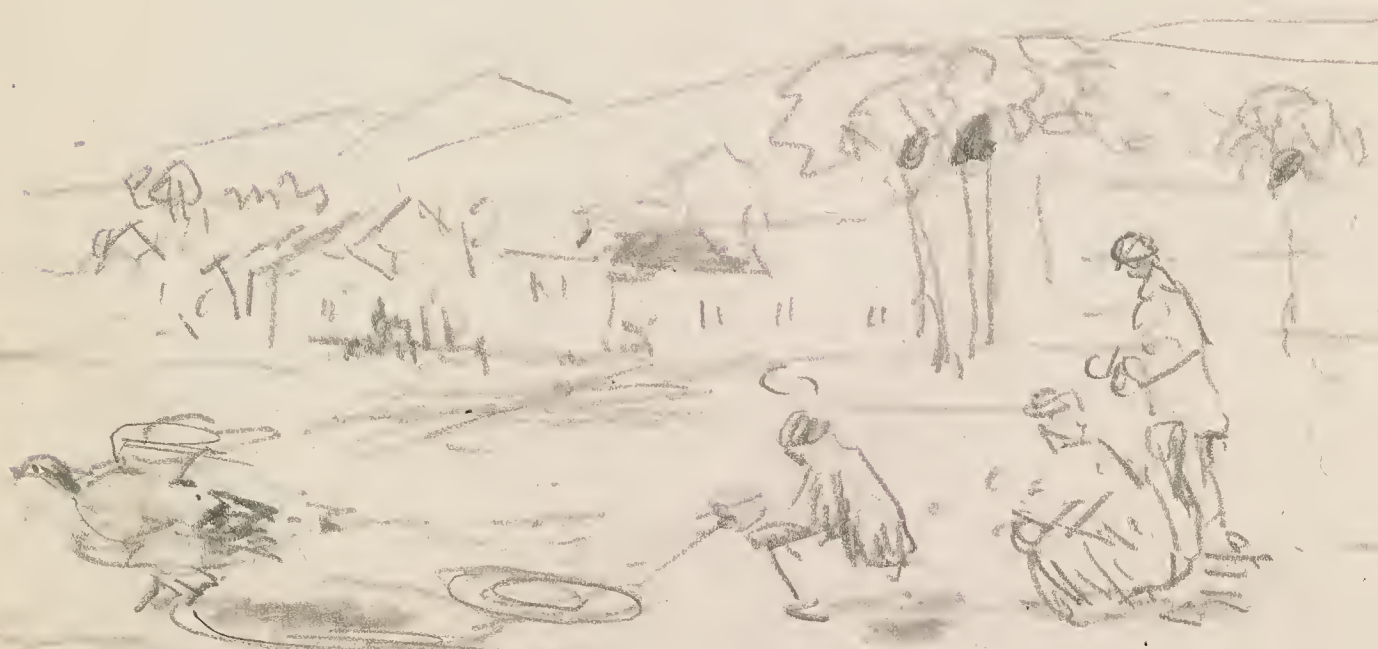
Tail to shoulder - 8 inches.

*I made photographs of which I have given
a set copies*

1900



How the Buzzard started from an elevation
Take off of the John Crow from the roof

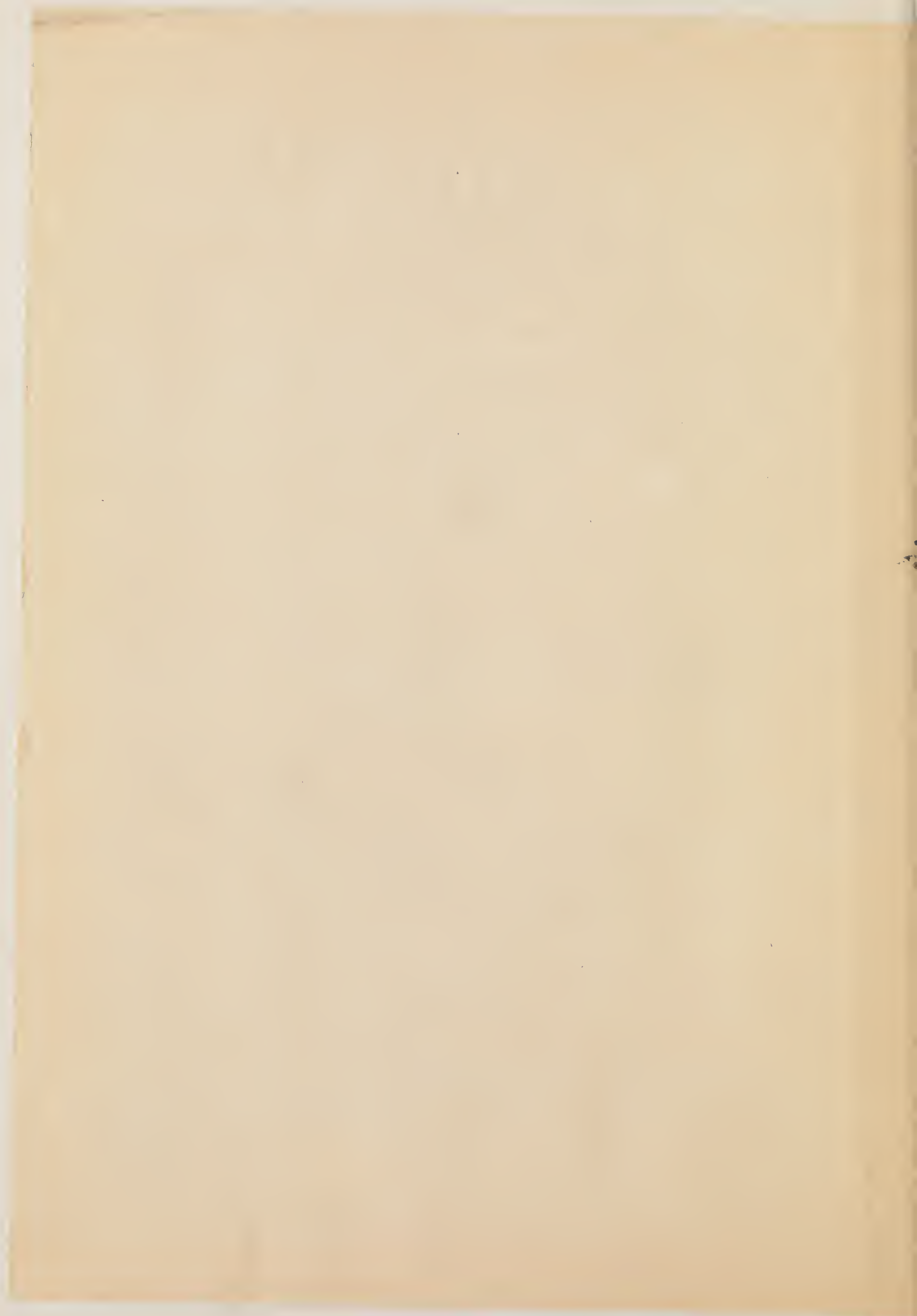


Take off of
the "John Crow"
from the ground

How the Buzzard starts from the ground
Should have been photographed



Langley machine in air without passengers





Should be
1903

The Langley Launching 1900



Dotted line shows
how it fell into the
Potomac when launched.

The engineer said to me later that
a broken bolt was responsible for the failure.
Sketch on the spot, with

but I think that the ^{lack of} momentum
was the cause of the failure.

UNITED STATES NATIONAL MUSEUM
BUREAU OF AMERICAN ETHNOLOGY
ASTROPHYSICAL OBSERVATORY
NATIONAL ZOOLOGICAL PARK

ALL CORRESPONDENCE
SHOULD BE ADDRESSED
TO THE SECRETARY



SMITHSONIAN INSTITUTION

Washington, U.S.A.

NATIONAL GALLERY OF ART
FREER GALLERY OF ART
INTERNATIONAL EXCHANGES
INTERNATIONAL CATALOGUE OF
SCIENTIFIC LITERATURE

September 9, 1929.

Dear Mr. Holmes:

In response to your recent telephone message, I am sending you herewith a photograph of Secretary Langley; his steam-driven aerodrome in flight over the Potomac on May 6, 1896, and a view of the same machine in the shop shortly after this flight.

In connection with your trip to Jamaica, you may be interested in looking at the chapter on the comparison of the buzzard with the Jamaican "John Crow", page 285 of the Langley Memoir on Mechanical Flight, sent herewith. Please return this volume, as it is my office copy.

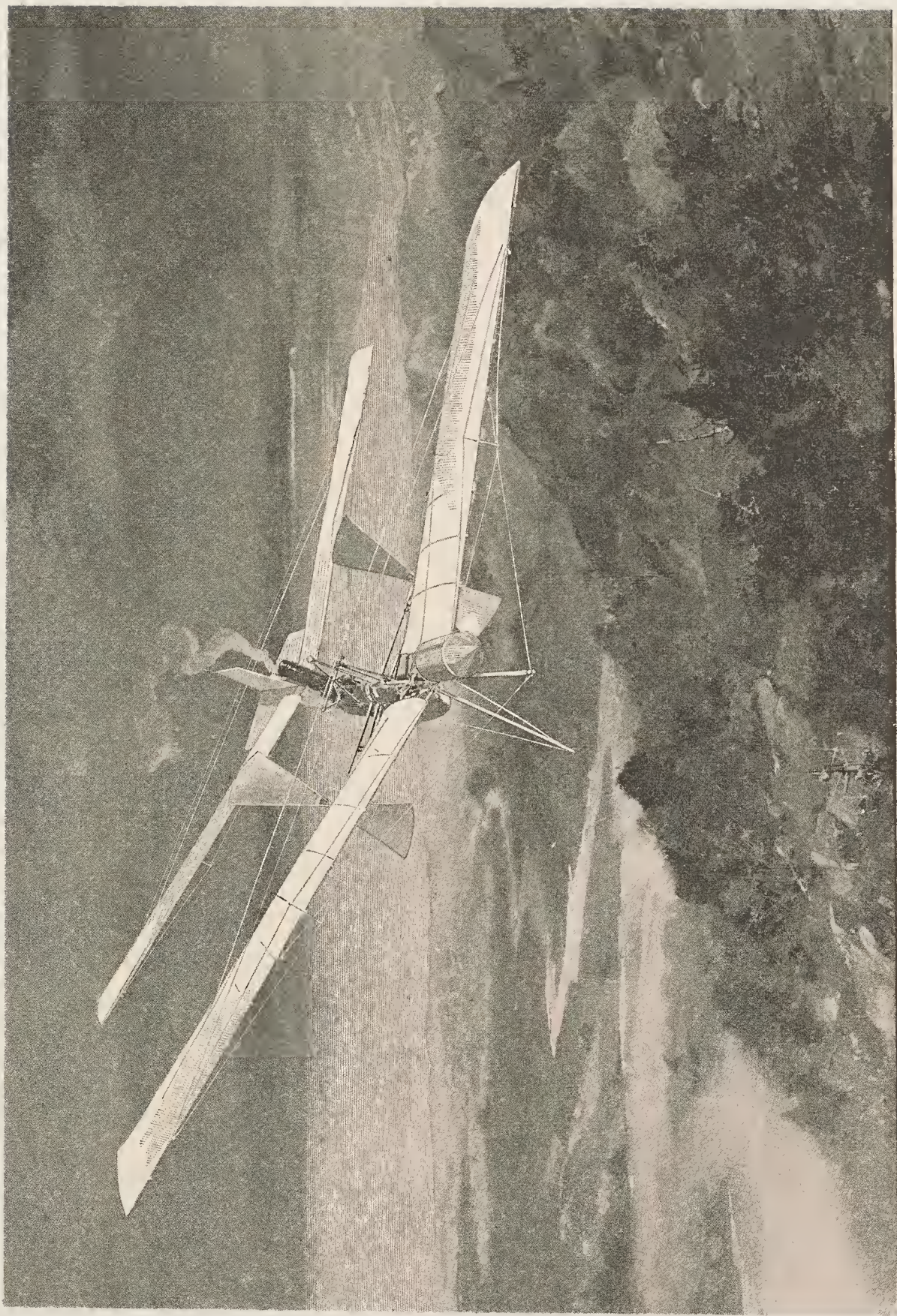
Yours,

W. H. Holmes

Mr. William H. Holmes,
Director, National Gallery of Art.



The Lighthouse.



PROFESSOR LANGLEY'S AÉRODROME IN FLIGHT: A VIEW FROM ABOVE.

with out pontoon

On February 12 we had reached Kingston, Jamaica, and the following description of the country and people is quoted from a letter addressed to Mrs. Holmes:

"This is a large and airy hotel with no end of verandahs shaded by graceful palm trees which shake their plumes like a graceful bird as the trade wind comes in from the sea. We are in the city but on the shore of the bay and a few ships lie nearby. All of these, British, American and the rest were gay with bunting -- the Stars and Stripes above all -- when we came into the harbor on Washington's birthday. It seemed quite like home to see these things and hear the salutes expressive of good will toward our country. But the English of these people is hardly better than the Spanish of Cuba. It is a funny Cockney dialect modified by the thick lips of the African. The island is black -- awfully black -- 600,000 colored to 14,000 white, and one sees little but Africa on the streets. Yesterday was market day and there were sights to be seen. I spent part of the forenoon kodaking in the markets. For a dozen blocks the streets were a mass of picturesque people -- nearly all women for there are nearly two women to one man on the island -- buying and selling. From morning until night the roads to the country are literally crowded with the picturesque women, tall, barefooted and black, bearing loads upon their heads or leading heavily laden donkeys. There must be 10,000 of these women trudge into town and out in one day. I was out seven miles yesterday and the roads were full of them and some come from 20 miles out.

A letter written to Mrs. Holmes while in Kingston, March 11, 1900, gives a glimpse of the rare charms of the islands:

(Extract from a letter
to Mrs. Holmes)

"It seems now that we shall soon be homeward bound -- and I am glad for it is so difficult to get from one island to another here that spring will be here before anything can be done. We have tried for two weeks to get to Cuba but have entirely failed. It will be impossible to reach Porto Rico without returning first to New York or going half way to Liverpool. We are tentatively booked for the Philadelphia fruit steamer that leaves Port Antonio on the north shore of this island on the 22nd of March. That will bring us home about March 27th.

"Since writing you we have been across the island by rail to Port Antonio and back again by carriage. It is all interesting, charming, superb. The north side is typically tropical, and the mountain as well as the shore scenery is hard to beat. At Port Antonio we met Professor Langley and Mr. and Mrs. Hague; the former is out with Powell at the town of Mandeville, and the Hagues are here.

I am busy every day securing and boxing collections and looking up sites. Yesterday was Sunday and I made some sketches. Today I finish my work here, the next day climb a mountain nearby and probably the next day start on a carriage journey 75 miles around the east end of the island.

Hotel in Montego, a wonderful soft colored sea-scape festooned in festoons and pendants of purple flowers.



"Yesterday I made a trip to the mountains, 9 miles eastward from Kingston and then 2000 feet up a steep trail. There were picturesque bits everywhere and the lookout over the sea was superb. Visited an old burial cave and dug up the floor to find pottery and bones. Snap-shotted some interesting bits by the way. In the evening Major Powell lectured at the Institute on his Grand Cañon trip. It was first-rate and the old man is so full of enterprise and vigor that it is impossible to keep him in check.

"Today we are off for Port Antonio on the north side of the island where we expect Professor Langley to arrive Monday on the "Admiral Schley" from Philadelphia.

"I am getting tired of the island but we are instructed to stay during Secretary Langley's visit which will continue for about ten days. I can make no plans until we see the Secretary and it may be that we will come home together. * * *"

Professor Langley joined us March 4th in Port Antonio, Jamaica, where he had arranged to make a careful study of the flight of the turkey buzzard, or John Crow, hoping to learn thereby something of value to his experiments with the flying machine which he was constructing.

Arriving at the local hotel I obtained measuring instruments and we began the study of the odoriferous bird. With the help of the natives specimens were easily caught by throwing out rats with looped cords, so that when they lit to pick up the rats, their feet were caught in the loops.

Measurements were made with much detail as indicated in my sketches. A large specimen was then, with the cord attached to his one foot, allowed to rise from the ground with the view of observing the movements of his wings. Photographs were made to complete the record. In order to observe the movements of the bird in taking flight from an elevated perch we tied dead rats to strings again and threw them out of the second story window to the roof of a shed beneath. The buzzards soon picked up the rats and turning began their flight with little apparent effort. Photographs and sketches were made for record. Professor Landley made a report on his observations which was published in one of the subsequent reports of the Institution.

When our work was completed we packed up our belongings and returned to Kingston, and after some delay took steamer for New York.

If you could get Mr. Holmes (who made most of the sketches and all of the photographs of the "John Crow"), to try and do something like this for your buzzard, especially getting such a photograph of it *in flight*, as will give the position of its center of gravity relative to the center of pressure on the wings, it would add very greatly to the value of your memoranda, and I think Mr. Holmes takes so full and intelligent an interest in the subject, that he might be pleased to give his help.

Very truly yours,

S. P. LANGLEY,
Secretary.

MR. ROBERT RIDGWAY,
Smithsonian Institution,
Curator, Division of Ornithology, U. S. National Museum, Washington,
D. C.

In response to this request, Mr. Ridgway submitted the following very interesting information:

SMITHSONIAN INSTITUTION,
UNITED STATES NATIONAL MUSEUM

WASHINGTON, D. C., October 16, 1900.

PROF. S. P. LANGLEY,
Secretary, Smithsonian Institution.

SIR:

I have the honor of submitting herewith the data obtained by Mr. Rolla P. Currie concerning measurements, etc., of the common Turkey Buzzard (*Cathartes aura*) of the United States, as requested by you in your letter of March 29, last.

The difficulties in the way of securing these data, already explained by me in previous communications, are responsible for the delay in submitting them.

Hoping that this material may prove of use to you, I am,

Very respectfully,

R. RIDGWAY,
Curator, Division of Birds.

MEMORANDA IN REGARD TO THE TURKEY BUZZARD (SECOND SPECIMEN)

1. *Weight*.—1850 grammes.

2. *Area of outstretched wings*.—641 square inches. (Computed from three sheets of tracings, A_1 and A_2 comprising the entire area of both wings; B , a single wing.)

Note.—As the bird was in process of moult, one of the large wing quills, as shown by the tracings and compo-board patterns, is but partially developed, thus slightly modifying the results obtained. Its length, if full grown, would be nearly the same as that of the quill just above it.

3. *Distance between the tips of these wings*.—5 feet, 8.7 inches.

4. *Distance between the tips of the same wings when the bird is in horizontal soaring flight*.—Estimating the dihedral angle of the wings to be 150° , and elevating the wings so as to make this angle, the distance between their tips

measures 5 feet, 5.7 inches, or 3 inches less than when fully extended in the horizontal plane.

5. *The position of the center of pressure of the wing.*—This is indicated on two compo-board patterns, *C* and *D*. *C* was made from a fully extended wing, while *D* was made from the wing in the soaring position. The centers of pressure of the wings are about 2 feet, 0.5 inches apart, or 1 foot, 0.25 inches from the central point of the bird's body.

6. *The position of the center of gravity of the soaring bird.*—(Length of buzzard, 26 inches.) The center of gravity of the soaring buzzard in the horizontal plane, CG_1 , was found to lie $9\frac{1}{2}$ inches behind the tip of the beak and $16\frac{1}{2}$ inches in front of the tip of the tail.

The center of gravity of the soaring bird in the vertical plane, CG_2 , was found to lie 2.8 inches above the ventral point of the body and 1.6 inches below the dorsal point, the depth of the bird's body at CG_1 being 4.4 inches.

In determining the center of gravity, the bird was frozen in the soaring position, its wings making a dihedral angle of 150° . It was then hung up, first horizontally and then vertically, and balanced till the line from which it was suspended coincided with a plumb-line placed in front of it; the measurements were then made.

The bird was afterwards, and while still frozen, hung up in the same way in Mr. Smillie's photographic room, and exposures made by him in both positions. These photographs, E_1 and F_1 were enlarged to natural size, and measurements made on the enlargements yielded, as nearly as could be determined, the same results as when taken directly upon the bird.

As determined by measurements upon the buzzard in soaring position, the center of gravity was found to be 2.65 inches below the center of pressure (estimating the center of pressure to be at the bend of the wing); or, employing the compo-board pattern in a corresponding position, the distance was seen to be a small fraction of an inch less.

7. *The position of the root of the wing.*—This is indicated on the tracing A_1 .

a. (Depth of the body on a vertical line with root, 3.5 inches.) The root lies 1.6 inches below dorsal line, 1.9 inches above ventral line.

b. (Length of body, 26 inches.) The root lies 7.6 inches behind tip of beak, 18.4 inches in front of tip of tail.

8. *The dihedral angle between the wings.*—The photographs taken previously were not sufficiently large or distinct to enable us to determine this with exactness. It was estimated, however, as 150° , and experiments were made on this basis.

9. *The center of gravity of the dissected wing.*—This was found, *first*, for the wing having all the muscles, up to the ball and socket joint, intact. One of the wings was frozen in the soaring position and its center of gravity found by balancing on a point. Its position was marked by a wire thrust through the wing at this place, and the wing (*H*) is preserved in formalin. This position is also marked on a special tracing, *I*. It lies 6 inches from the base of the humerus bone (root of wing). *Secondly*, it was found for the wing denuded of all muscle. Its position was marked on the other wing of the bird, which is preserved dry, spread in the soaring position. It lies $9\frac{3}{4}$ inches from the base of the humerus.



market on the picturesque path up to ?



Japan 1900







La Juncua



942 Cuban Farmers.

Cuba



Costa Rica





Cuba or Jamaica

The story of the visit to Cuba and Jamaica
get from Vol VIII

VOLUME VIII

SECTION II TRIP TO CALIFORNIA WITH MCGEE. 1898



Bridal Veil fall, Yosemite
valley by Thomas Moran
presented to W.H. Holmes by
W.F. Woods, in Washington 1880.
Moran was here at the time

W.H. Holmes

CALIFORNIA EXPLORATIONS, 1898

Under a special authorization from the Secretary, the Ethnologist in Charge, Mr. W. J. McGee, with Mr. W. H. Holmes, of the U. S. National Museum, made an extended ethnologic and archeologic reconnaissance in California during October, November and December. The district examined comprised the western slopes and foothills of the Sierra Nevada, including the Table Mountain Region from Yuba River southward to Tule River; a portion of the northern coast range region, centering about Ukiah; typical portions of the Sacramento Valley, centering about Stockton, and the coastwise areas and offshore islands of the southwestern region of the state.

The primary purpose was the collection of artifacts representing the aboriginal culture of the Pacific coast province; a secondary purpose was the collection of prehistoric relics, the comparison of these with the early historical period, and the general study of the culture history of the region. The operations resulted in substantial enrichment of the Museum through the acquisition of new material, and indirectly the opportunities for local work led to the acquisition of a highly useful collection of basketry - the Hudson collection - which throws much light on the aboriginal handicraft and motives of the California Indians.

SMITHSONIAN INSTITUTION
UNITED STATES NATIONAL MUSEUM

S. P. LANGLEY
SECRETARY, SMITHSONIAN INSTITUTION

WASHINGTON, D. C., September 21, 1898.

Dear Sir:

In compliance with the suggestion contained in your letter of September 19, I am pleased to authorize your absence from the Museum for a period of six weeks, or somewhat longer if in your judgment required, for the purpose of conducting explorations in the far West under the direct auspices of the Smithsonian Institution. It is understood that the National Museum will not be called upon to defray any expenses in connection with your explorations.

Yours respectfully,

Richard Rathbun

Assistant Secretary.

Mr. W. H. Holmes,
Head Curator, Department of Anthropology,
U. S. National Museum.

having recently been built from
Oakdale to near Sonora.

I shall, so far as I now
know, be here during October;
and Mr. Branner and I shall
expect you to put up with
us while you can stop at
the University. And we hope
it will be longer than most
of the Washington visitors see
fit to stay.

By the time you get here
I hope I may have gathered
a few clues worth following
up.

I was awfully glad to see that
you received the doubt-free

Very truly,
W. H. Holmes, R. P. Branner
Washington D.C.

Sept. 6, 1898.

Dear Prof. Holmes:-

I am delighted at
the prospect of your coming to
California to tackle the
Auriferous Gravels.

I don't know much about them,
but I have heard some - many-
stories that have made me
long for time ^{and} means to take
hold of the matter.

I shall be delighted to do
anything I can to help you.
I have written already
to persons from whom I
have had information asking
for whatever they can tell
me that is tangible.

The Table Mt. country is easily
accessible now, a railway

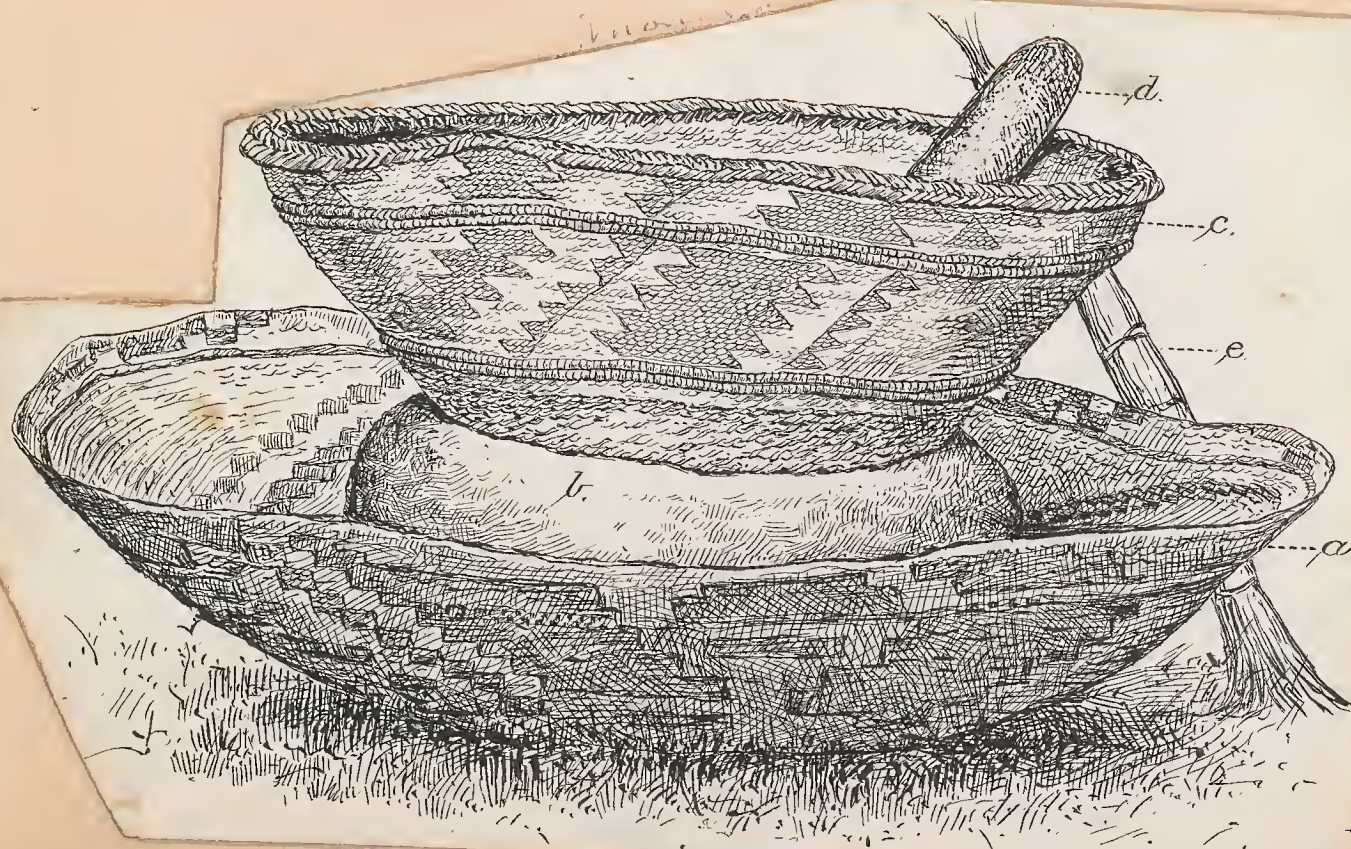
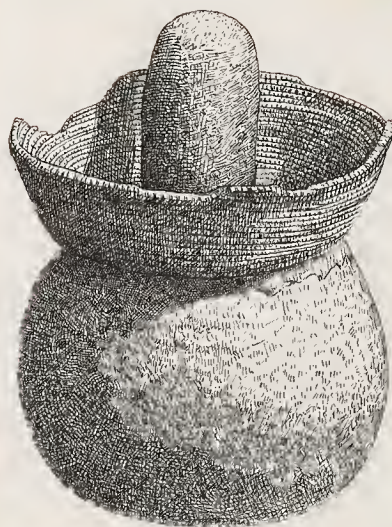




LICK OBSERVATORY, MOUNT HAMILTON, CALIFORNIA
4,200 feet above sea level



B. POMO WOMAN POUNDING ACORNS IN MORTAR WITH BASKET HOPPER. PRIMITIVE COSTUME.



Mortars



Coast-



Indian Miller



79833 AT THE MILL, INDIAN WOMAN GRINDING ACORNS, YOSEMITE VALLEY, CALIF.

great millstone

The Indian population of California is a little over 16,000. About 5,000 of these are on reservations, the rest are self-supporting. Practically all of the Indians now within the State are descendants of Indians that always lived there, as no Indians from other states have been transferred to reservations in California.

The manners and customs of all the tribes are practically the same. They practice agriculture to some extent but live mainly on nuts and berries and game. A fairly nourishing bread is made from acorns ground in this ^{one} primitive mill.



Threshing with
the flails



Millstone



Millstone



millers



Bought of Dealer

Yuma Woman grinding corn

C.C. Pierce & Co. photo Los Angeles

1347



View in an Indian camp - California, 1898



An eagle's nest on a rock in the old gold digging
of California. Dr. Meeker standing at left.
photo by W. H. Holmes, 1898

33 Sept. 1899
+ again in 1902

RESEARCHES IN CALIFORNIA

1898

This was one of the most interesting years of my career as an archeologist. Several previous years had been devoted to the study of the problem of man's antiquity in America, and my prolonged investigations in the eastern United States served to demonstrate the soundness of my views on the significance of the several classes of stone implements. Of special interest were those rudely chipped objects customarily assigned to great antiquity and upon which the glacial, paleolithic people and culture had been **predicated**. My studies showed that they were merely the rejectage of implement making of Indian tribes. Other features of the antiquities of considerable importance were verified, among which were especially the phenomena of the quarries of soapstone and the manufacture of implements of stone of all varieties.

Good fortune this year made it possible to carry these researches into the far west and especially into the gold-bearing region of California where evidence had been obtained to show that man was present in the period of the formation of the gold-bearing gravel, the age of which reaches back into the tertiary period hundreds of thousands of years ago.

The fall months of 1898 were spent in a delightful series of excursions in California. I had the opportunity of studying the Indians and their primitive but most interesting arts at first hand, and of making important collections of

stone implements, basketry, and other artifacts for the National Museum. I also had occasion to examine the collections in the various California museums. These studies are recorded in detail in several publications of the Smithsonian Institution and the Bureau of American Ethnology for the year 1898, and a paper of upwards of **forty pages** appeared in the American Anthropologist, Vol. I, 1899.

Wm. H. Henshaw + collection

STUDY OF THE ANCIENT SOAPSTONE QUARRIES
AVALON, SANTA CATALINA ISLAND, CALIFORNIA,
November 2, 1898.

AN INTERESTING DAY

This has been a red-letter day with me from the point of view of hard work and "good hunting" in archeology and artistic effects. I set out at 7:00 in the morning with the Mexican, Joe, as a guide, on a pony that was better fitted for an old woman than for a mountaineer, and that made the day slow and hard but I got there all the same. Climbed the steep ridges of the island by a trail to the summit and thence along the sharp ledges to the highest point, called Blackjack Mountain, and thence on a long ridge to Pots Valley, that is to say, the valley of the stone pots.

I found the ancient quarry pits everywhere about the valley and across the range to the south side, square miles of the ridges having been worked over to greater or less extent. The soapstone seems to have a very wide

distribution, though generally not well fitted for use for the manufacture of vessels or other articles. At the site of the principal quarry, illustrated by Schumacher, there has been some recent quarrying but the particular mass from which the ancients cut so many pots remains undisturbed. The cutting has been done with all kinds of picks and chisels, some of them certainly with steel tools with well squared edges about $1\frac{1}{2}$ inches in width, judging from the markings. Cactus covers a large part of the surface so that a careful study of the old rock could not be made. There are some four or five hundred square feet of the sloping surface quite covered with the stumps, rings and partly rounded out masses in sight. Scattered about this spot over the area worked I found many broken, unfinished vessels mostly deep bowls in general outline,

some broken pestles and numerous rude, cutting tools crudely flaked out, dark slates and quartzite boulders. The latter had been sharpened by a few strokes of the hammerstones. There were also numerous hammerstones used probably in shaping these tools and possibly also in shaping pots and pestles. I observed one oblong, shallow dish of schistose rock with symmetric, oblong shallow depression, and one fragment of very neat bowl shaped mortar made of vascular basalt, also pieces of mortars and pestles, the latter made of a variety of stones. In looking for shaping tools on a little rise forty or fifty feet from in front of the principal quarry rock, I saw a bit of the rim of a vessel sticking out of the ground. Picking it out I found it to be a shallow, steatite disk, well shaped but somewhat irregular in outline. Picking about a little I found human

bones and then my pick struck an obsidian arrowpoint, then followed other discoveries and it turned out that this was a burual, probably of a single person, so shallow that but few of the bones were left and none of the articles were deeper than six inches . Bits of the skull, jaw, and other bones were found but their relations one to another could not be traced.

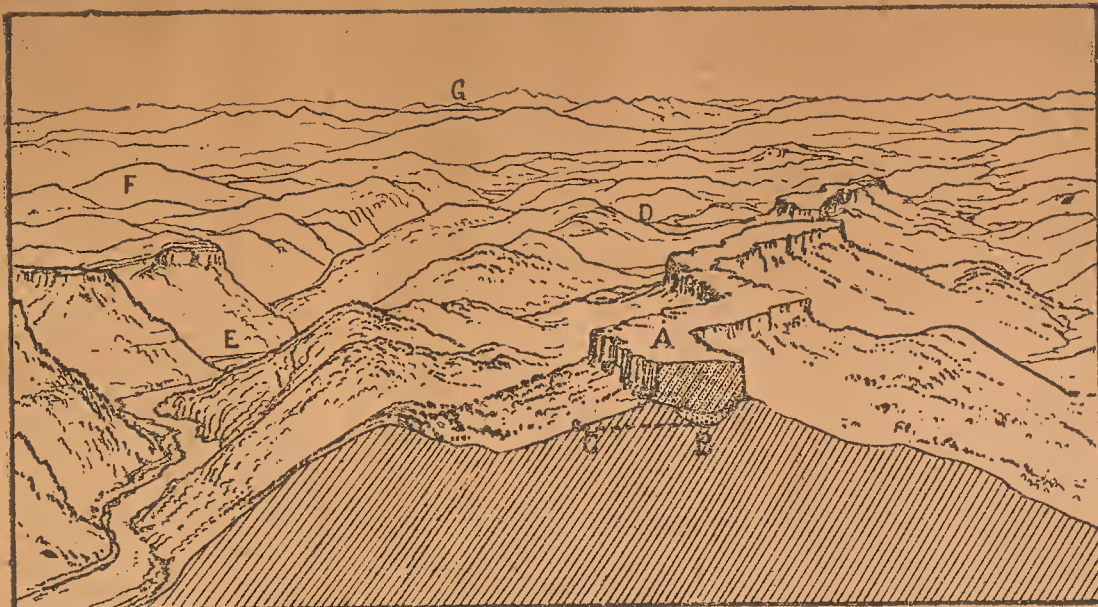
There were also parts of three or four vessels. One a neat pot, one a spoon-shaped pestle with a squared end, and two oblong dishes. There was one hook and one piece of fetish, shown in the figures, one miniature pestle of hard stone, three pieces resembling handles of bowls made of steatite, probably merely intended to be buried with the dead, two badly decayed shell ornaments and other things.

The day was too nearly spent to undertake any further examinations of this section of the island and late in the afternoon I took the trail back over the high ridges and peaks of the island. On descending from the summit of the highest point the evening had come on and I was witness of possibly the most wonderful scenic effect that has ever fallen to my lot. The immediate slopes of the island were smooth save for occasional outcrops of rock and partially covered, especially in clusters with scrubby vegetation. Lower down on the slopes the sea has encroached upon the sides of the island and had cut them into pinnacles of varied shapes which displayed many pleasing colors, including reds, purples and yellows. Beyond these was the wonderfully blue-green ocean reflecting the sky, being a hundred times deeper and more wonderful, and twenty-five miles away off over the broad

expanse was the coast of California plainly in sight, bathed in the light of the evening sun. As I observed these effects I discovered away off across the California coast a cluster of white spots which reminded me of sheep. These soon developed in size and began to move across the surface of the ocean and I soon discovered that it was a fog bank forming, spreading over the surface of the water. Rapidly it spread and advanced and struck the pinnacles of the island and rose in great volume enveloping the pinnacles, and finally the entire surface of the island. It is this effect that I have, in a number of cases, tried to paint.

Descending the steep ridges night came on and although we were on a well made road which descended to the village of Avalon, my guide said that we should have to return by the narrow and somewhat dangerous pathway by which we had

ascended for the reason that horsemen were not permitted to use this road as it belonged to a private corporation. I said to the guide Joe, "you may keep the trail, I keep to the road," and I reached the hotel safely somewhat late in the night.



Panorama Showing Lava Cap of Table Mountain (A), and the Gravels of the Buried Eocene River Beneath (B).

ANTIQUITY OF MAN

Prof. W. H. Holmes' Study of the Problem in California.

RESULTS SOMEWHAT STARTLING

Upsets Long-Cherished Beliefs of Many Prominent Scientists.

THE NEWEST FACTS

Among the eminent archaeologists of this country the genuineness of the famous "Calaveras Skull" as the cranium of one of a race of men existing millions of years ago is again the current subject of doubt and investigation.

In this connection also interrogative inquiry is busy with the alleged evidences of the antiquity of "Auriferous Gravel Man," and the conclusion may soon be formulated by authorities upon the subject that it is all a myth.

New and interesting scientific light is thrown upon the long-disputed points by investigations but just finished by Prof. William H. Holmes, the distinguished anthropologist and one of the head curators of the National Museum. Prof. Holmes occupies at present an entirely neutral position with regard to the matter, because he has not had time in which to study and consider the mass of data he has secured.

Authorized by Secretary Langley of the Smithsonian Museum, Prof. Holmes went to California in September last to study the problem of human antiquity, which has become somewhat knotty to scientists since the alleged finding of the "Calaveras skull" and certain fossil remains in Calaveras county, California, by the forty-niners digging in the earth for gold.

Prof. Holmes spent nearly two months at the work, and conducted it with all the care and precautions to be expected of him as one of the leading authorities in the domain of archaeology. He returned to the city recently and has furnished The Star the following account of his investigation and apparent conclusions. It makes one of the most important contributions to the literature of anthropology written in recent years, and may possibly lead to a revolution among the theories and beliefs upon the subject. It is:

The Human Race.

"For a generation past students of history have been breaking away from traditional notions of the age of the human race in the world. In Europe, it is conceded, there are traces of man in the glacial formations, carrying our history back a hundred thousand years or more, and in eastern North America much evidence has been adduced tending to show that this continent was occupied at least at the close of the glacial period, from ten to twenty thousand years ago. California has, however, put forth claims to still greater antiquity, and, as if determined to outdo the world in this, as in other things, claims to be the cradle of the race, par excellence. She is not satisfied with the 5,000 years of the orthodox chronology, the twenty thousand claimed for the Trenton man, nor yet the 100,000 or more conceded to the paleolithic man of England and the continent of Europe, but sets her figures for the Homo sapiens of the high Sierra back so far that seven figures are necessary to express the time if years instead of ages are to be the unit.

"The story of the discoveries that lead to these astonishing conclusions is fascinating indeed, and the manner in which geology furnishes the chronological key must elicit the admiration even of the unscientific reader.

The First Discoverers.

"Soon after the hardihood of the forty-niners began to open up the great gold belt of the Sierra Nevada there filtered out into the outer world rumors of strange finds in the gravel beds from which the gold was washed. Reports of the discovery of fossil mammals, the mastodon, the rhinoceros, the horse, the camel and many other forms, and fossil plants, including petrified trees, and, finally, traces of man and his arts, were reported. The best known and most widely heralded find was that of a human cranium, known as the Calaveras skull, brought up from the depths of a mining shaft on Bald mountain, near Angel's Camp, Calaveras county. Other discoveries followed and included implements, utensils and ornaments of stone, the mortar and pestle occurring most frequently. Many of these objects came from the region of the Tuolumne Table mountain, and were reported to have been brought out by the miners from deep shafts beneath the lava beds that cap the mountain. There was, as a matter of course, little appreciation of the character and significance of these finds, for the men in that day were devoted, soul and body, to the search for gold; but the occurrence of human remains under flows of lava from volcanoes long since extinct was curious enough to excite some interest, and even then there were skeptics who said it could not be. The discoveries that followed are most humorously alluded to by Bret Harte, who in 'The Society Upon the Stanislaus' makes Truthful James 'tell in simple language what I know about the row that broke up our society upon the Stanislaus.'

Geological Research.

"These finds took on a more serious phase, when about 1860 Prof. J. D. Whitney, director of the state survey of California, took up the work of assembling and interpreting the evidence and Mr. C. D. Voy brought together a collection of the relics in San Francisco. The finds had been made by miners and mine superintendents, and Whitney visited these people, heard their stories and secured more or less valuable affidavits. He was convinced that the discoveries were genuine, and believed the evidence sufficient to establish the existence of a pliocene race in California. A long report was made, embodying the evidence and promulgating his beliefs. He was followed by others, and there was a pretty general acceptance of his conclusions among students of anthropology and scholars generally.

"But recent investigations have tended to increase rather than to diminish the age assigned to the gold-bearing formations. Their age has been made out in great detail by the able geologists of the United States geological survey, and the period of gravel depositions is shown to be a prolonged one, beginning far back in middle tertiary time and extending forward to the close of that vast period. Whitney believed all to be late tertiary or early post-tertiary, while many others have preferred to believe them of glacial age, and following the suggestions of their own beliefs and desires in the matter of human antiquity, have thought of the glacial age in the Sierras as probably later than that of the eastern side of the continent, thus bringing the geological chronology of man down toward that of the biblical chronology.

"Now, however, these delusions are finally dispelled by the researches of Lindgren, Turner and others, who tell us that the auriferous gravel man of California, if he really existed, was vastly older than even Whitney was willing to admit. The interest of the problem is thus greatly enhanced and there is a very general desire to have the whole question thoroughly aired.

"Independently of the question of human origin and development thus associated with the history of the Sierra Nevada there is not a more fascinating chapter in the whole history of world building than that furnished by the orographic transformations now so closely made out by our geologists. The story may be told in a few words, and so simply as to convey an understanding of the methods of determining age and a realization of the vast time involved.

"The richest finds of gold made by the forty-niners were in the great valleys that cut their way down through mountains, plateaus and foot hills from the high ranges to the Sacramento valley. The gravel of the present river beds yielded much of the precious metal, but the richer deposits were in beds of gravel that outcropped in the sides of the valleys from one to two thousand feet above the river beds. These bodies of gravel were found to extend in attenuated bands far into the



Prof. W. H. Holmes.

mountains, and the rocky slopes were pierced by a thousand tunnels. The summits of the wildest mountains were honey-combed in the eager search for other leads. "When the geologists finally appeared upon the scene the strange fact was developed that these deposits of gravels were of river formation, and that they really represented fossil rivers, the grandfathers and great grandfathers of the present rivers, which, in early tertiary times, had been clogged with gold-bearing gravel and then filled to the brim with volcanic materials. Lindgren and Turner have studied these remnants of past river systems, and have determined the course, declivity and age of the streams, and the miners have, in several cases, followed the sinuous courses of the channels entirely through the ranges, washing out the gold and leaving the gravel still in the tunneled channels, as a wood-worm pierces the oak, leaving only slight traces of his wonderful accomplishment. But what a remarkable succession of events this implies; what a vast time is involved and what an age is given to the races that pounded seeds or acorns in their mortars along the banks of those far-away ancestors of our modern rivers.

Work of Rivers.

The story they tell is about as follows: The tertiary rivers ran out across the high land pretty much as the streams of today find their way to the sea. They had strong currents, and scored down their slaty or granite walls and the gold-bearing quartz seams intersecting them, and filled their beds with the debris. The freed gold sank to the bottoms and the coarse water-worn materials accumulated to the thickness of hundreds of feet.

"It is upon the banks of these rivers that the race must have lived that left its bones and its tools and utensils imbedded along with the bodies of the giant mammals of their time. Then came a change over these scenes—a profound and wonderful change; a period of great volcanic activity followed, and lavas flowed and streams of mud descended, until the valleys were filled up and new channels, system after system, were formed. At the close of a vast period of these activities the deepest valleys were filled up to overflowing, and when the flows of basalt, the final products, ceased the waters of the Sierra had to begin anew the cutting of thoroughfares to the Pacific. This volcanic period continued through a large part of the tertiary age—a period not to be estimated in thousands, but in hundreds of thousands of years.

"But behold the changes that have since taken place! These streams—the Marced, the Tuolumne, the Stanislaus, the American river, the Yuba and others—have cut their way by the slow processes of erosion down deep into the bowels of the earth, and now run their courses in valleys 2,000 feet deep and many miles in width, so profound, precipitous and inaccessible that it is a day's journey to cross them, where indeed they can be crossed at all by human feet.

"The traveler who descends into one of these great canons and painfully works his way up the opposite side to the crests, where the miners are tunneling the river beds of former periods, finds himself soliloquizing in the following vein: 'Is it possible that man can have dwelt in this wild land so long as this, while these mountains were carved out and the vast valleys formed by the tedious sculpture of the mountain streams? It, indeed, surpasses belief, and unless the most weighty evidence is forthcoming, the whole story of auriferous gravel man must fall.'

"But this is not all the geologist has to tell of the flight of time. When the valleys had been deepened nearly to their present beds the glacial period came on, and the ice reshaped them and modeled the marvelous contours of which Yosemite is a fine type. From the point of view of the man of the old river systems the glacial period is recent time, but this is the period of the paleolithic man of New Jersey and Ohio, if such there was, and the glacial man of Europe had not, even at this late date, reached the status of culture attained by his California precursor a million years before, if such a precursor there ever was.

Table Mountain.

"This panoramic sketch is not well calculated to give an idea of the magnitude of the geographical features with which we have to deal, but it may serve to show something of the geological relations. Table mountain, A is a long narrow table land extending outward toward the west between two valleys from 1,500 to 2,000 feet deep. The summit of the mountain is sinuous as a serpent, for it is the stream of lava that flowed into the bed of the ancient river whose gravely, gold-bearing bed is seen in the section at B. The streams cut their channels at the sides because the lava was harder than the neighboring formations, and what was originally the valley is now the mountain crest. The dotted lines in the section show how the tunnels pierce the sides of the mountain and reach the main channel of the old stream in the heart of the mountain, and it is from these deep diggings under Table mountain that many of the human relics are said to have been brought forth. At C we have the undisturbed formations of the mountain. At B is Tuttletown, where still lives 'Truthful James.' To the left is the profound Valley of the Stanislaus, and beyond this, and twenty miles away, at C, is Bald mountain, where, in a deep tunnel in formations corresponding to those of Table mountain, the Calaveras skull was found.

"Stranger than all are some of the facts

encountered when we come to consider the physical characteristics and culture of auriferous gravel man. The human creature of a period so remote might be expected to betray some characteristics suggestive of his connection with the lower forms, for the race of mammals was then young, but the Calaveras skull, about which such a marvelous chapter in history has been constructed, belonged to a man quite equal to the average man of today in craniological development, and the evolutionist, if we accept the antiquity of the specimen, must receive a shock from this fact quite as stunning as does the ordinary descendant of Adam and Eve. Perhaps, as Bret Harte, poet, giving thee an air that's somewhat in addressing this skull, forcibly suggests—

"The professor slightly antedated by some thousand years thy advent on this better fitted for cold-blooded creatures."

"Perhaps the most striking feature of this strange story of early tertiary humanity is that the traces of his activities, so plentifully brought to light, indicate not

that he was struggling with the beginnings of the most elementary arts, as we might reasonably expect, but that he had reached the ripe state of culture known as neolithic, and ground his acorns in well-rounded and neatly decorated stone mortars, with symmetric, artistically shaped pestles, shaped fine obsidian blades for use in the chase, decorated his person with well-wrought beads and employed fancifully shaped stones of various kinds in his arts or ceremonies. Along with these things went, no doubt, the appropriate accompaniments of advanced society, institutions and customs, and when we come to compare these varied objects with the tools and utensils of the tribes of men now living in California we are forcibly struck with the resemblances, and, indeed, in many cases with the absolute identity of the forms. This again caused the cautious investigator to pause and ask, 'Is it not possible that some mistake has been made and that auriferous gravel man is a myth?' But we turn to the evidence, to the writings of Whitney, Becker and others and to the statements of many miners and mining people, and are compelled to acknowledge its force.

The Affidavits.

"Mr. Thomas Matteson found the Calaveras skull in his shaft on Bald mountain at the depth of 125 feet, and the following affidavit is furnished by Professor Whitney, who took the trouble to visit the mine and secure it:

"SAN ANDREAS, Calaveras county, Cal.,
January 3, 1874.

"This is to certify that I, the undersigned, did, about the year 1858, dig out of some mining claims known as the Stanislaus Company, situated in Table mountain, Tuolumne county, opposite O'Byrne's Ferry, on the Stanislaus river, a stone hatchet, similar in shape to this (here is inscribed a rough drawing of a cutting implement of a triangular shape) with a hole through it for a handle, near the middle. Its size was four inches across the edge, and length about six inches. It had evidently been made by human hands. The above relic was found from sixty to seventy-five feet from the surface gravel, under the basalt and about 300 feet in from the mouth of the tunnel. There were also some stone mortars found at about the same time and place and at various times where there were also found numerous fossil bones of different animals, and fossil wood.

"(Signed JOHN CAROM.

"Subscribed and sworn to before me,

"WM. O. SWANSON, Justice of Peace,

"Calaveras county, Cal.

"And, again, there is the sworn statement of Mr. J. H. Neale of Sonora, given by Dr. Becker:

"SENORA, August 2 1890.

"In 1877 Mr. J. H. Neale was superintendent of the Montezuma Tunnel Company and ran the Montezuma tunnel into the gravel underlying the lava of Table mountain, Tuolumne county. The mouth of the tunnel is near the road which leads in a southerly direction from Rawhide camp, and about three miles from that place. The mouth is approximately 1,200 feet from the present edge of the solid lava cap of the mountain. The course of the tunnel is a little north of east.

"At a distance of 1,400 and 1,500 feet from the mouth of the tunnel or of between 200 and 300 feet beyond the edge of the solid lava, Mr. Neale saw several spear heads, of some dark rock and nearly one foot in length. On exploring further, he himself found a small mortar three or four inches in diameter and of irregular shape. This was discovered within a foot or two of spear heads. He then found a large, well-formed pestle, now the property of Dr. R. L. Bromley, and near by a large and very irregular mortar, also at present the property of Dr. Bromley.

"All of these relics were found the same afternoon, and were within a few feet of one another and close to the bed rock, perhaps within one foot of it.

"Mr. Neale declares it utterly impossible that these relics can have reached the position in which they were found excepting at the time the gravel was deposited, and before the lava cap formed. There was not the slightest trace of any disturbance of the

mass of any natural fissure into it by which access could have been obtained, either there or in the neighborhood.

"And Mr. J. H. Neale declares upon his oath that the foregoing statement is in every respect true.

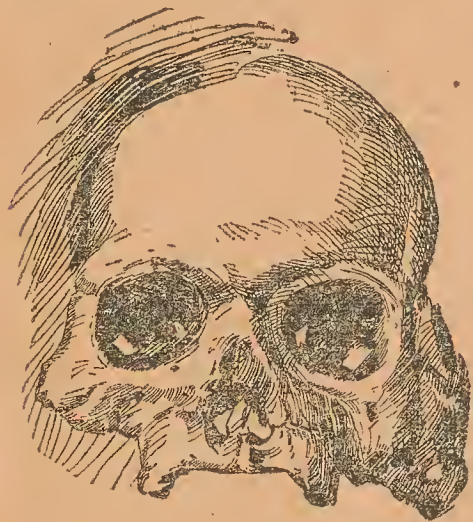
"(Signed.) JOHN H. NEALE,

"Subscribed and sworn to before me this second day of August, 1890.

"(Signed.) EDWIN A. ROGERS,
"Notary Public.

"And still more authoritative than these is the find by Mr. Clarence King of a pestle, well-shaped, though fragmental, in the old gravels underlying the lava cap of Table mountain.

"When we consider the amount of this



The Calaveras Skull.

evidence and the apparent association of the remains and relics with the remains of extinct animals, and supplement these statements by the statement that such men as Whitney, King and Becker consider the accumulated data sufficient to satisfy them, all must allow that there is evidence, and evidence, too, worthy of serious consideration.

A Visit to Table Mountain.

"A visit to the auriferous region has a fascinating interest to the geologist and student of human history. The ground is made classic in science and in song, and the story of the gold hunters, and especially the gold finders, of '49 is unequalled in the realms of romance. But a look into the deserted shafts of Table mountain and a visit to the few surviving members of the Society on the Stanislaus afford little aid to the student, for the observations, preserved in tradition and recorded in books, cannot be made over again. But it is a great satisfaction to read the geologic story on the spot and a pleasure indeed to interview the sturdy men whose lives span the whole recorded history of the golden age of California.

"Angel's Camp, which was the site of the first discovery of auriferous man, is still a typical mining town, and here, and at Murphy's near by, are to be found a score or more of sturdy forty-niners who have vivid recollections of the early days and take great pleasure in recounting the events of that eventful time. Many have a more or less definite knowledge of the finding of the Calaveras skull, some from actual knowledge of the circumstances, some from hearsay, and it is a noteworthy fact that nearly all of them agree that the story of the finding of the skull is a 'fake.'

Joke on a Scientist.

"One of these men, now occupying a position of honor in the community, laughed heartily when the subject of the ancient skull was referred to. 'I was in Angels at the time,' said he in substance, 'and can tell you all about it. The boys of those days were given to an inordinate love for "joshing," and, under the leadership of J. C. Scribner, many practical jokes were perpetrated. Why, I had that skull, with the mate to it, in my store for weeks before the scheme of making sport out of it was thought of. They were brought to me by J. I. Boone from a burial place at Salt Springs, twelve miles west of Angels. Scribner got hold of one of these skulls and conceived the notion of "joshing" his

friend Mattison, who had a mine on Bald mountain near by. It was finally planted in the bottom of the mine and duly discovered by Mattison's workmen. Then the conspirators, not getting much satisfaction out of Mattison, carried it to Dr. Jones, at Murphy's, who was the leading physician of the section, and a great collector of curiosities. He took it in, but later, finding cobwebs inside of it, threw it into the street; but, relenting, took it up again and resolved to give it a show; and this was done when Prof. Whitney came along. It was shown to him and the story of the finding told him. He took a deep interest in it, as a matter of course, and departed at once to find Mattison, from whom he secured the affidavit as to the circumstances of its discovery. All were delighted to have the joke on Whitney, who, being an easterner of very reserved demeanor, was unpopular with the miners. So the story began, and that is all there is in the business.'

"Other versions were heard and a few individuals were found who doubt the story of deception and say the old men of Angel's are still given to 'joshing.' These stories, however, do not seriously affect the evidence found in Table mountain and elsewhere, but they serve to indicate the difficulties that surround a proper investigation of the subject, and it is only by a most painstaking gathering and sifting of the various strands of evidence that a solid basis of fact can be reached.

"As the question stands today the very imposing group of facts and observations arrayed to support the theory of great antiquity of man in California is compelled to meet objections so strong that they may not be able to withstand the onslaught of skepticism."

(84)
BUS TO AND FROM ALL TRAINS
LIGHTED THROUGHOUT WITH ELECTRICITY

OFFICE OF

TELEPHONE, NO. 21

1898

THE
- PALACE HOTEL -

(Formerly the Curtis House)

O. E. WILLIAMS, PROP.

A NEW FIRE-PROOF BUILDING

ALL MODERN CONVENIENCES

STAGES ARRIVE AT AND DEPART FROM THIS HOTEL
HEADQUARTERS FOR COMMERCIAL TRAVELERS

Ukiah, California. Thursday Oct. 13 1898.

My Dear Kate

I must write you a line from this far away village in N.W. California. We came up yesterday from San Francisco - 150 miles through a valley of grapes - the fields are purple with the fruit and there are acres of raisins spread out in shallow boxes over the fields getting ready for market. We are here looking up a considerable collection of baskets. Dr Hudson & his wife - who counts Indians very well live in an out building they call a studio & have an ideal life. The Indians are all about by hundreds & the doctors here & the parents there are between them - they got all the nice basketry going. We drove out with us to the nearest village yesterday afternoon & I picked up some interesting things.

If you are able to buy the Hudson Collection the Museum will have by far the finest collection.

of feather decorated baskets in the world)

I have been very busy visiting collections in San Francisco and at the State Museum & Peabody Museum. China town is very interesting and the City and vicinity are interesting & wonderfully varied & beautiful.

Received your letter, the last saying you were to return direct to Washington. I am glad to have you at home & to get William at school. I hope you will find yourself perfectly well and that you put your thoughts at work on the beautifying of the old place as you indicated.

Tomorrow we go to San Francisco again and then Sunday go up into the Sierras again.

As ever yours
Will



272 SUREN'S GULCH.

La Plater Mts. Colorado 1874



RAINBOW FALLS, YOSEMITE VALLEY
T. MORAN

Copyright, 1905, by Thomas Moran

VOLUME VIII

SECTION III VISIT TO MEXICO WITH DUTTON AND
GILBERT, GUESTS OF MR. BRECKENRIDGE,
1899.

TRIP TO MEXICO

1899

Good fortune smiled on me again when in the early spring of 1899 I was asked to join a party of scientists on a trip to Mexico. Mr. George W. Breckinridge of San Antonio had asked Major Dutton, who was then a resident of San Antonio, to accompany him on a visit to Mexico and to invite one or more scientists to join the party and the invitation was extended to me, as indicated by appended letters and telegram. I reported at San Antonio on April 1, 1899.

Mr. Breckinridge is a banker and in appearance resembles Secretary Langley. He is an agreeable man who enjoys outings of the kind proposed. G. K. Gilbert, the geologist, was invited to join the party which travelled by a special car by way of Monterey, Tampico, Orizaba, Cordoba, Vera Cruz to Mexico City, arriving on April 7. Our itinerary involved five or six trips with the City of Mexico as a starting point, some being for geological and others for archeological observations. Mr. W. W. Blake of Mexico City, an old friend of mine, joined us in some of our trips.

The following quotation from a letter addressed to Mrs. Holmes from Orizaba on April 7, 1899, will give an informal touch to the otherwise formal accounts of the trip. It seems that my notes have largely disappeared and the only publication resulting from the trip is a study of the Obsidian mines. (see paper on same, American Anthropologist, 1900)

"Although I have written Orizaba at the top of this sheet, I am really at Cordova, 20 miles lower down the road toward Vera Cruz. Our car is standing on the sidetrack here in front of the station where we were dropped off at three this afternoon. It is eight in the evening and is dark with a dripping rain outside. Dutton and Gilbert are at the table playing cribbage and Mr. Breckinridge is playing "solitaire."

Since writing you last in Monterey we have been constantly on the go through dust and rain and chill and heat over half of Mexico. Yesterday afternoon we reached the City of Mexico, attended to some business and then set out for this point. We would have gone on to Vera Cruz but Dutton seemed to fear the yellow fever. The trip to Tampico was given up for the same reason. There is as yet no yellow fever in the country and there is no danger. Our object in coming here is to see the great peak of Orizaba, (see picture in the Cosmos Club), the face of the great plateau where the highland breaks off next the Gulf and to get a glimpse of Popocatepetl on the way. Our itinerary is now made out for five or six trips with the City of Mexico as the starting point. Some of these are archeologic and some are geologic. I found my friend W. W. Blake in Mexico City and he will go with us on two or three of the trips.

I have sketched a little as we ran, but of course the results amount to but little. I may get time to sketch something at Orizaba tomorrow where we will probably tie over for a day. It is ^avery picturesque place with plenty of bridges

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and old cathedrals. Cordova is a small village hardly changed since its settlement 300 years ago. It is in the midst of a region of canyon table lands and deep tropical forests where all kinds of fruit and flowers grow and where the plantations of coffee and bananas are everywhere. But with all this the people are a primitive lot, mostly Indians and mixed bloods, who can never rise much above this present level."

Mar 12 9

My Dear Holmes

I have just written a long letter to Herbert regarding if you & he can go to Mexico as the guests of Mr. Geo. W. Brackenridge, leaving San Antonio about Apr. 1st, going to any part of Mexico you like. Having a private car & you two being the persons whose desires would determine when the car should go where it should stop, & how long, you might find it as agreeable & profitable trip. Mr. B- has no object in view of his own except to get away

To you

Geo W Brackenridge

business can & not off his hands
for a while & to do anything that
may add to the pleasure & riches
of his guests.

As I have written rather fully
to Hilbert I want to ask you to
see him at once & get further
details & then consult with him
so that you can advise me as
soon as possible of your decision.
He likes Hilbert & is interested
as much for you as for him.

Very truly yours
C. C. Sutton

SAN ANTONIO, TEXAS

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March 22nd 9. D. W.

My Dear Holmes

I received your telegram
~~the~~ just a moment ago 2 ¹⁵/₆ Central
time saying "Howell away knows
nothing shall I look him up" &
I replied at once "We had better
omit Howell on the whole".

I could not think that
Brackenridge has been too self
denying in this matter. I know
he contemplated asking a Dr.
Smith of Galveston but refrained
because six would be a rather
large party than can be perfectly
comfortable & leave room for
"sitting a cat". You remember
that Howell was intended as

To you

Geo W Brackenridge

a ~~kind of~~ for Willard Smith
now that Willard is expected
back - will not ask Smith
& I think he ought to if he
~~does~~ wants to. If Smith is
away it is an excellent opportunity
with to leave Brooklyn to
follow his own untampered
heart in the matter. When first
advised that Willard was in
Florida he insisted on my
drawing a note there & I promised
Smith but protested that he
ought to carry out his original
intention of asking Smith. But
he insisted on my naming another
to the party to the Back &c

Willard Holmes Button & perhaps
Smith. The latter is a capital
fellow.
I shall be delighted to see
you once more & please old
times when we were young &
best beautiful & when the moon
beamed & the nightingales sang
- or rather when the songbirds howled
& the cactus opened its arms
to us.

Very cordially Yours
C. S. Button

Mar 20th

My Dear Holmes

Your letter received & I am very sorry that Gilbert cannot come. I have just seen Brackenridge & as he wanted a substitute I hesitated for a while between Dillon & Newell & thought finally that Newell would probably get the most advantage out of it. B- framed a telegram accordingly which was addressed to you as King you transmit Newell, which I take it is far granted you have done.

You had better bring with you a dress suit (evening), a good business suit & a travelling suit for a dusty car. When you

To you

Geo W Brackenridge

got here you cross Burlington
goods into a flat stunner trunk
which can go under your trunk
& have as many small boxes
& trunks as you like. A large
trunk is not easily stowed in
the contract space of a car & you
do not want in the regular
baggage car.

I hope you will be here on
Apr. 1st or soon if you like.
We shall ~~try~~ try to get away by
Apr. 2nd!

Very truly yours
G. S. Wetten

It took just 15 minutes

After looking this letter a
Telegram came from Wash. office
saying that ~~the~~ a Telegram of
mine could not be delivered because
my address not given. I have
had the office here send it on.

THE WESTERN UNION TELEGRAPH COMPANY,

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RECEIVED at Wyatt Building, Cor. 14th & F. Streets, Washington, D. C.

March 20 1899

San Antonio Texas 20

W. H. Holmes Washn D.C.

(Care National Museum)

Projected trip arranged. Be here on April first. Bring Newell if you can. Come straight to my house.

C. E. Dutton

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NUMBER	SENT BY	REC'D BY	CHECK
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RECEIVED at Wyatt Building, Cor. 14th & F. Streets, Washington, D. C.

March 20 1899

San Antonio Texas

W. H. Holmes, Natl Museum Washn D.C.

Major Dutton advises me of contents of your letter and suggests invitation to Professor Newell in which I heartily join and beg you to convey our joint invitation if agreeable to you.

Geo W Brackenridge

OBSIDIAN MINES.

Obsidian, a volcanic glass of very diversified characteristics of color and texture, was much utilized by the American aborigines in their arts. It occurs in vast deposits in the western half of Northern America, in Mexico and Central America. The workings have so far received but meagre attention. In 1878 the writer made superficial studies of the remarkable deposits of ^{them scattered in} the Yellowstone Park and especially of obsidian canyon where cliffs of black, rudely columned glass rise to the height of 100 feet or more. The refuse of aboriginal operations observed at a number of points indicate the manufacture of the usual varieties of chipped implements, (fig. 2). Obsidian was worked somewhat extensively in the mountains of northern New Mexico, in Nevada, and Arizona, and the Pacific States are exceedingly rich in

this material, and although no important quarries have been located there can be little question that such exist. Among the most remarkable chipped implements in America and in the world ~~of this material~~ are the obsidian knives of California, the largest of which are upwards of two feet in length and at the same time are of remarkable symmetry and beauty of finish. ^(24 3) It is an especially noteworthy fact that the art of working obsidian is practised successfully as a matter of gain today by certain California Indian workmen ~~(fig. 2)~~.

Obsidian was quarried extensively in Mexico, and the best known mines are found in the state of Hidalgo about twelve miles northeast of the mining city of Pachuca, and on the mountain known as Sierra de las Navajas or the "Mountain of Knives."


It was the writer's good luck to visit the Hill of Knives in 1898. The journey was made in company with Professor G. K. Gilbert and Major C. E. Dutton, and the trip over the mountain roads beyond Pachuna was an extremely rough one. While at the mines we were the guests of Senor Amador, owner of the hacienda on which the Hill of Knives is situated. The lower slopes of the mountain are covered with open pine forests, in places overgrown with tall grass, and on the steeper parts, with underbrush. Everywhere are scattered fragments of obsidian, and groups of irregular mounds alternating with depressions and pits extend indefinitely up the forest-covered ridge. The pits and depressions are the ancient mines, while the hillocks are the heaps and ridges of debris thrown out from them.

The enterprising peoples of the valleys below must have operated the mines vigorously for centuries to have thus worked over hundreds of acres of the mountain side, and so fully and profoundly, moreover, that the deep pittings and heavy ridges of excavated debris are

practically continuous for a mile or two in length and over a width reaching in places possibly half a mile. It is not unlikely that there are other worked areas in the vicinity, ~~not reported to us~~. No outcrops of the obsidian, or, in fact, of any other rock, are to be seen on this part of the mountain, and it is apparent that the ancient miners had exploited the entire slope in search of deposits lying at varying depth beneath the surface.

THE
TINGS.

The depth of the wider depressions usually does not exceed six or eight feet, but some are deeper, and many take the form of wells from three to ten feet in diameter and often fifteen or twenty feet deep, with vertical or overhanging walls. Many of these must have been much deeper, for the debris thrown out is more extensive than the present openings would ^{suggest} warrant,

and there can be no doubt that in numerous cases tunneling was continued horizontally or obliquely for considerable distances along productive layers. The heaps and ridges of debris thrown out are rarely above ten feet in height, but they are well-pronounced and abrupt, and the total irregularities of the ^{slope} ~~site~~ are so great that exploration is tedious and difficult. Very generally the debris is intermingled with broken obsidian, and in many cases it seems to consist almost exclusively of broken fragments and flakes left by the workmen engaged in ^{get} rough-
ting-out the forms desired. In places there are large heaps of flakes where the choice fragments of stone were brought from the mines and placed in the hands of the flakers to be worked. ^{up} ~~up~~ 

Extensive areas are covered with these deposits of

pure black ringing flakes and fragments. One great heap which lies upon the mountain slope is over forty feet in ^{slope} vertical extent and many feet in depth, comprising perhaps 20,000 or 30,000 cubic feet of flakage. Efforts were made to dig into this remarkable deposit (fig. ⁴/₃),

SITS OF
AKAGE.

but no headway could be made as there was no earth to hold the flakes together and the holes dug were immediately filled by sliding, tinkling slivers of glass from above, every piece of which seemed as clean and incisive of edge as when struck off by the workmen hundreds of years ago.

HAMMERSTONES.

Being without appliances for descending into the deeper pits, little was learned of the subterranean phenomena, and no traces were discovered of the implements used in the mining operations, save a number of hammerstones, which are identical in shape with those used in our northern quarries (fig. 4). The larger

specimens, four or five inches in diameter and somewhat discoidal or cheese-shaped, may have been employed in breaking the obsidian in the mass, but the smaller, many of which are globular in form, must have been used in the hand simply, or with a light haft attached, in the work of breaking up the fragments and in trimming them down to the desired contour. The stone is usually a tough lava, and the peripheries show the usual evidences of battering.

It is well known that the ancient dwelling sites of the general region are strewn with countless knives which have been derived by fracture from cylindrical, faceted nuclei or partially exhausted, specimens of which are widely distributed, and evidence of the getting out of these nuclei was to be expected on the quarry site. Examination

developed the fact that here the rejectage deposits
abound in abortive nuclei which were rejected because
lacking in some of the qualities necessary to successful
blade-making (fig. 5). It was requisite that the material
should be fine-grained, flawless, and uniform in texture;
the shape had to be cylindrical, and it was essential
that one end should be smoothly squared off, so that the
flaking tool would have exactly the proper surface for
receiving the stroke or other form of impact required for
removing the long slender blades. Of course, the flake-
knives were not made upon the quarry site, as the edges
of the blades were so delicate that transportation would
have subjected them to injury; therefore, the selected
nuclei were carried away and the knives made, and by
expert workmen, whenever and wherever they were required.

6
nuclei
PLATE)
CLEI FOR
KNIFE
MAKING.

It is impossible to form any reasonable estimate of the number of successful nuclei produced and carried away, but the product of the work on this site must have been enormous. Examples of the exhausted cores found widely distributed over the valley of Mexico are shown in figure 6.

Beside the rejectage of nuclei-making and the hammer stones already referred to, a few other varieties of artifacts were obtained on the quarry site. In some of the heaps of refuse there were found a number of scraper-like objects (fig 7), made by taking a long, thick flake with one smooth, concave side, and removing a few chips around the margin of the wider end on the convex face giving a keen scraping edge. It is surmised that these were employed in shaping and sharpening the wood and antler tools required in the quarry shop work.

Strangely enough, there seems to be an almost total absence on this site of the manufacture of incipient leaf-blade forms from which knives, spearpoints, and arrowheads were usually specialized, but blade-derived implements are found plentifully in the fields about the base of the mountain (fig. 8). They must have been produced in other quarries than those examined.

It may be difficult to identify the workers of these mines with any particular people, but it would seem safe to conclude that the Aztecs had a hand in the work. The knives were found in extensive use by this people and the sites of these as well as of other stocks abound in the characteristic implements.

NOTE:- Other Mexican Quarries.

W. W. Blake



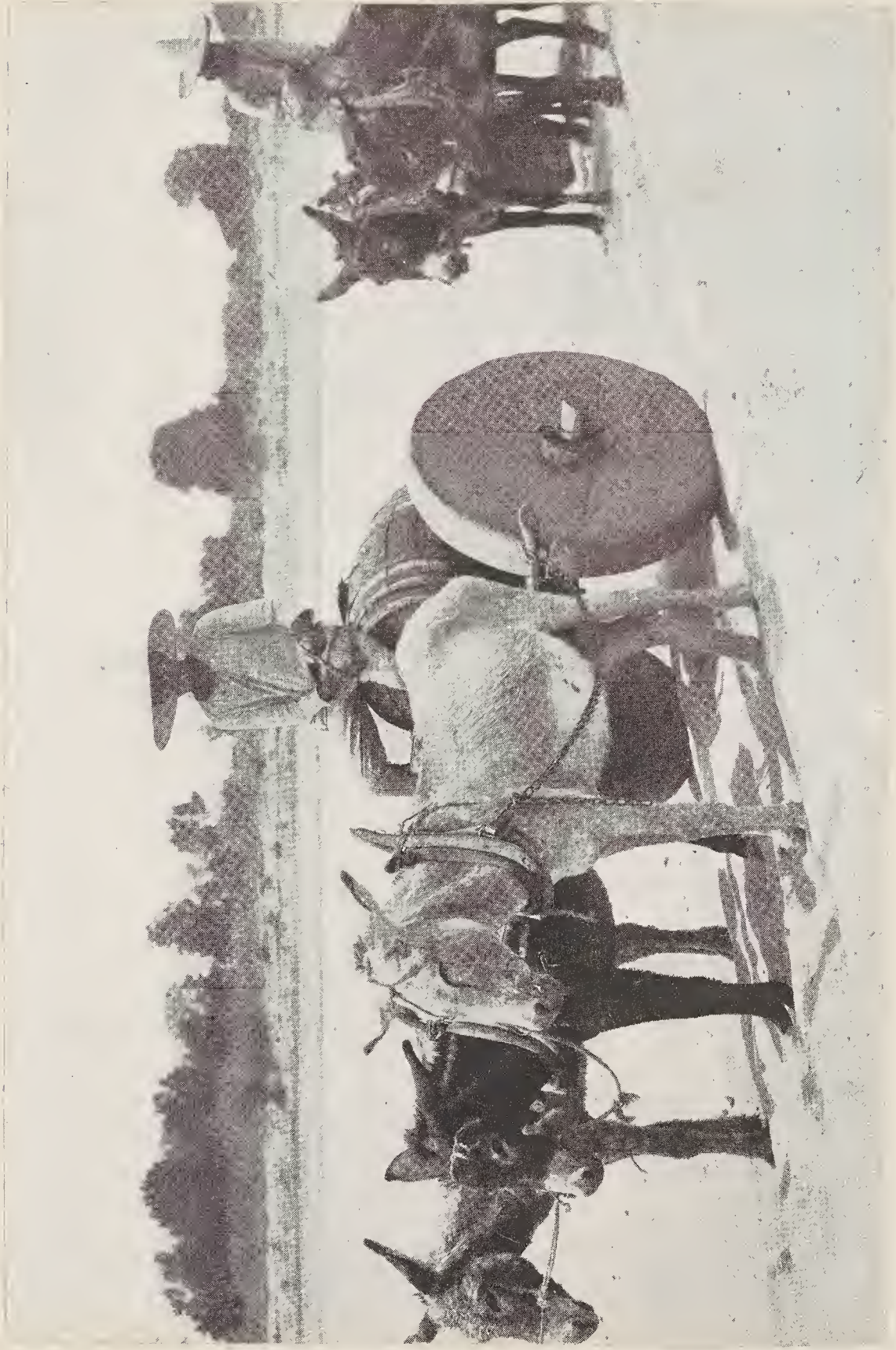
W. H. Holmes

Obsidian Flakage of Implement Making.

wasteage of obsidian
implement making



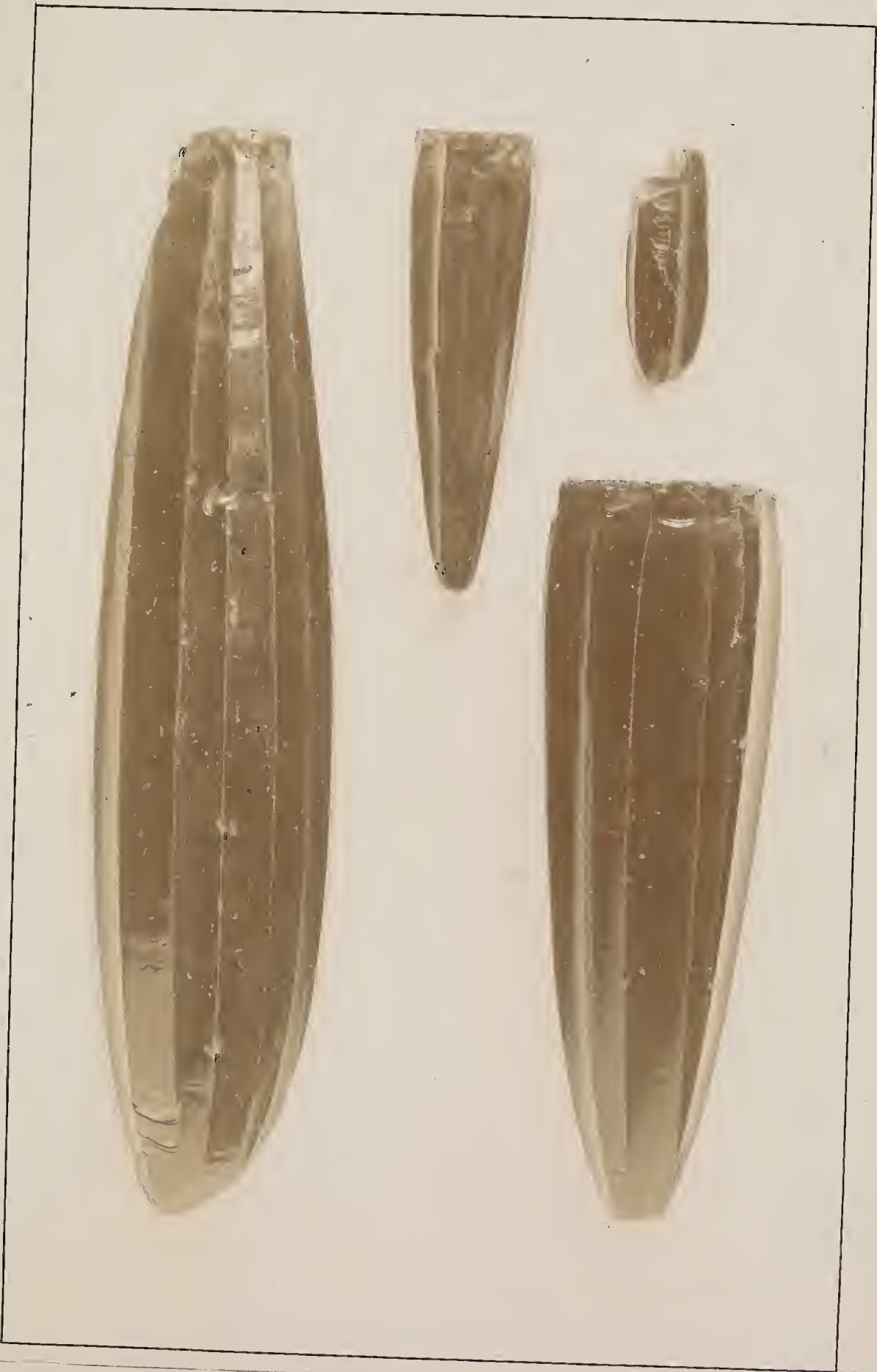
Two natives on the shore



The Water Wagon - Mexico

Cores from which plate
pieces have been struck off

The stroke of the hammer
was delivered at the flat end



REDUCE THIS LENGTH

TO THIS

505 Hall

VOLUME VIII

SECTION IV ORGANIZATION OF THE DIVISION OF PHYSICAL
 ANTHROPOLOGY, ALES HRDLICKA APPOINTED
 CURATOR.

FOUNDING OF THE DIVISION OF PHYSICAL ANTHROPOLOGY
IN THE NATIONAL MUSEUM.

(1902)

On taking charge of the Bureau of Ethnology, I was much impressed by the discovery that little attention was being given to Physical Anthropology and was at a loss under the conditions of personnel^{and}/funds of the Bureau to suggest a remedy.

Happening one day to visit the Army Medical Museum, which occupied a building near at hand, I observed the large collection of human cranium, said to number some 2200, belonging to that Museum and on inquiry found that they were not at present being utilized for any purpose. Immediately I asked for the transfer of the collection to the National Museum. This was readily granted and the appointment of Ales Hrdlicka, Curator of the new Division of Physical Anthropology, followed. The position was really made for him as the only satisfactory candidate available at the time.

I am naturally proud of having provided the place for one who is an honor to the Institution and who today, 1930, takes the highest rank in his chosen field in America. The collection of crania has grown in 28 years from 2200 to upwards of 11,000.

SMITHSONIAN INSTITUTION
UNITED STATES NATIONAL MUSEUM

S. P. LANGLEY
SECRETARY, SMITHSONIAN INSTITUTION

WASHINGTON, D. C., November 5, 1902.

To Mr Langley

S i r :

You will no doubt recall my conversation with you regarding the needs of the Department of Anthropology with respect to reenforcing its curatorial staff. The death of Doctor Wilson has left the curatorship of Prehistoric Archaeology vacant, but, as I have already explained, the needs of this division are not urgent, and Mr. Upham working under my personal supervision will be able to care for the division until we are ready to undertake the reclassification and reinstallation of the archaeological collections. My own transfer to the Bureau leaves additional available funds, the two salaries now unallotted amounting to the sum of five thousand seven hundred dollars. Now I beg that you will permit me to present a measure which I have had in mind for several years, i.e., the foundation of a division of Physical Anthropology in the Museum. Just now there are especial reasons why this measure should be taken up, but these reasons I have already explained to you in detail.

PLAN FOR THE ESTABLISHMENT OF THE PHYSICAL ANTHROPOLOGICAL
DEPARTMENT UNDER THE SMITHSONIAN INSTITUTION.

To establish under the Smithsonian Institution in the City of Washington, a Fund to be known as the Physical Anthropological Fund with requisite laboratory facilities, the general purpose of which shall be a comprehensive biological study of the many and diversified racial elements of the American nation, and the application of the results to promoting the welfare of the nation.

Among the particular lines of work which should be pursued are the following:

1. A determination of the character and potentiality of the physical, intellectual and social elements which the nation should control, direct, and assimilate.
2. A determination of the results of the intermingling of the white, black, and other races, on physical development, longevity, fecundity, vigor, and liability to disease, as well as on the intellectual and social attributes, and an elucidation of the operation of heredity and the effects of changing social and climatic conditions, so that a firm base of knowledge may be provided for those who are to frame and administer laws relating to these objects, and those who are to direct the policy of the thousands of institutions that deal directly or indirectly with the physical and intellectual and social welfare of the nation.

3. Physical, physiological and pathological investigations on the living, and physical studies of such remains of man as may be essential in carrying out the purposes of this foundation.

4. Cooperation as far as possible with all agencies, now existing or hereafter established, engaged in collecting data relating to the physical, mental and social man, in such manner as to encourage in the broadest and most liberal way investigation, research and discovery in the field specified.

5. The utilization of existing collections of anatomical material, and the supplementing of such collections, so far as necessary or feasible, by procuring and maintaining the laboratories necessary to the purposes herein defined.

6. The publication of reports, memoirs, etc., and the distribution by means of lectures and publication of the results of the activities of the proposed establishment.

In general, to do all and everything that may be requisite to the fulfilment of the purposes of this Fund.

Researches Relating to the Racial and National
Elements now Entering into the Composition
of the American Nation.

WMA

The proposed researches have for their object the scientific study of the American people with a view to their present betterment, and the intelligent molding of their future. The ethnic elements of the world are now assembling in the United States, and the foundation of a new people, mentally, physically, and culturally, is being laid. It is the most striking and momentous occurrence of its kind known in history, and is fraught with the deepest possible interest, national, historical, scientific, economic, and ethical. It affords a great, and vital, what must prove a brief opportunity to witness and record the intermingling of the racial elements of the world, and the resultant physical, mental, moral and pathological manifestations in all stages and in every phase. Growing out of these conditions, there is apparent a great national duty and responsibility. It is a self-evident fact that a knowledge of the elements of which a nation is made up and with which it has to deal, is the first essential to the intelligent administration of these elements; yet, so far

the character and potentiality of the ethnical ingredients which this nation assumes to incorporate, control and direct, are, in a great measure, unknown or known but imperfectly. A profound acquaintance with these diversified elements and the complex problems pertaining to them, can be obtained only through the accumulation of a vast body of fully classified and well digested observations, and science and philanthropy can have no more noble aim than is thus suggested.

The essential features of the plan are:

(1) To establish under the Smithsonian Institution in Washington, a Fund to be known as the Anthropological Research Fund, to be employed in conducting investigations relating to the diversified races and peoples now entering into the composition of the American nation.

(2) To establish in Washington under this Fund, a central office and research station or laboratory, for the prosecution of the proposed investigations, and branch research stations at favorable points and in connection with suitable institutions throughout the country; the necessary buildings, apparatus, and equipment of whatsoever nature to be provided from the income of the Fund.

Among the lines of work requiring particular attention are the following:

(1) Determination by extended observations of the

character and potentiality of the diversified physical, mental, and moral elements which the American nation must direct, control, and assimilate.

(2) Determination of the results of the intermingling of the white, black, and other races, on physical development, longevity, fecundity, vigor, and liability to disease, as well as on the intellectual and moral qualities, and an elucidation of the operation of heredity and the effects of changing social and climatic conditions, so that a firm base of knowledge may be provided for those who are to frame and administer laws relating to these objects, and those who are to direct the policy of the thousands of institutions that deal directly or indirectly with the physical, mental, and moral welfare of the nation.

(3) Investigations among children of all nationalities and races - their development at every stage and in every phase, - since it is during childhood that the effects of heredity, education, and environment are best observed.

(4) Cooperation as far as possible with all agencies, now existing or hereafter established, engaged in collecting data relating to the physical, mental, and moral man, in such manner as to encourage in the broadest and most liberal way investigation, research, and discovery in the field specified.

(5) Utilization of existing collections of anatomical material, prehistoric and recent; procuring and maintaining in connection with the research stations or elsewhere such additional collections of anatomical and other material as may be necessary to the purposes of the research.

(6) The publication of reports, memoirs, etc., and the dissemination by means of lectures and instruction, and in other ways, of the results of the investigations carried on by means of the Fund herein provided.

The proposed work is of wide scope, and necessarily to be effective, of long duration. No hasty or superficial research will avail. The collection of data should be extensive, and systematically made. The knowledge should be comprehensive and profound, and when this end is surely accomplished the application of the results to definite national and institutional purposes must be as assured and accurate as is the application of determinations in any other of the great branches of science.

Confer with Prof. Holmes.

SMITHSONIAN INSTITUTION
UNITED STATES NATIONAL MUSEUM

S. P. LANGLEY
SECRETARY, SMITHSONIAN INSTITUTION

WASHINGTON, D. C., November 15, 1902.

Mr. W. H. Holmes,
Head Curator, Department of Anthropology,
U. S. National Museum.

Dear Sir:

Acting upon your letter of November 7, the Secretary has approved the organization of a new division in the Department of Anthropology in the National Museum, to be known as the Division of Physical Anthropology, and has directed that the necessary steps be taken for arranging an examination by the Civil Service Commission to provide a register from which an appointment may be made at \$1800. per annum. Please advise me as soon as practicable as to the scope of this examination in order that the Civil Service Commission may be requested to provide a list of eligibles as soon as possible.

Yours respectfully,


Assistant Secretary.

Handwritten text at the top of the page, possibly a title or header.

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G. Physical Anthropology.

Among the misleading statements made by McGee is one to the effect that the well-matured plans of the Bureau of Ethnology were interfered with by the appointment of a Curator of Physical Anthropology in the United States National Museum. This is a grievance entirely without foundation. McGee has been speaking in hyperbole in his reports and elsewhere about the work of the Bureau in this branch, but the Bureau, so far as I am aware, has conducted no researches in Physical Anthropology and it paid no attention to this branch until forced to do so by pressure from without. The subject was entirely ignored by Director Powell. Under McGee's administration nothing was done beyond the purchase of two manuscripts, neither of which is complete and neither of which is now in the possession of the Bureau. One of these manuscripts (36 pages) written ten years ago, was purchased from the author in 1897 for \$200.00. It is now in his ^(author's) hands and he demands \$500.00 to finish it. The other manuscript (42 pages) was purchased in 1899 for \$200.00, and the author, in replying to a recent inquiry, states that he is not certain whether it is in his possession or not.

The employment of a Curator of Physical Anthropology in the National Museum has no necessary connection with, and certainly no objectionable bearing on, the immature plans of McGee with respect to somatic researches in the Bureau. There was a great collection of crania and other osteological remains

in the Army Medical Museum which I have transferred to the N. M.

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6. <The earlier researches of the Bureau have dealt rather meagerly with the physical characters and mental attributes of the native races, but the field is one worthy of the most careful attention. It is of importance (1) to record the physical characters of the red race before it is emerged into a race of hybrids or becomes extinct; (2) to study the phenomena of hybridity, and to trace the effects of changing social conditions on these people and on the other races with which they are combining; and (3) to secure material for the comparative study of the physical characters of all races.> It is important (1) to take up researches into the mental characters of the red race, using modern methods; (2) to study the mental traits including such as relate to hybridity, degeneracy, idiocy, lunacy, and criminology, and trace the effect of these characters as blending with the white race proceeds; (3) to record these observations for comparison with corresponding observations among other races.

7. <The suggestion of the establishment of a laboratory where the physical and psychological work referred to above could be carried on, is perhaps worthy of consideration by the Secretary. In this work the Bureau could join hands with the National Museum. A convenient laboratory would be required, of a size sufficient to accommodate the necessary skilled assistants, workmen, and appliances. To this laboratory all visiting delegations of the native tribes could be brought, to be photographed, measured and cast. The work of the laboratory could also extend to some extent to the tribes on their reservations. The records, properly made, would be of great importance to anthropological science, and in comparative studies of the racial elements now entering into the composition of the American nation may prove of much practical value.>

they would

W.H.H.

Dr. A. Hrdlicka took charge of the newly organized Division of Physical Anthropology on May 1, as assistant curator, and Dr. G. T. Moore, of the Department of Agriculture, became custodian of the new Section of the Lower Algae on May 25. The designation of Mr. W. T. Swingle has been changed to that of custodian of the Section of Higher Algae."

(Annual Report, Smithsonian Institution, 1903, page 26)



Dr. Ales Hrdlicka

HRDLICKA, Ales, anthropologist; b. Humpolec, Bohemia, Mar. 30, 1869; s. Maximilian and Carolina H.; common and high school, with Latin and Greek, in Bohemia; M. D. New York Eclectic Coll., 1892, New York Homoeop. Coll., 1894; Md. Allopathic State Bd., 1894; Investigations among insane and other defective classes, N. Y. State Service, 1894-99; medico-legal and anthropolog. studies Paris U. and Anthropol. Sch., first half 1896; m. 1896. Anthropol. expdns. to Mexico, 1898, S. W. United States 1899, 1900, S. W. United States and Mexico, 1902, 1905, Florida, 1906, Wisconsin, Washington, California and Arizona, 1908, Egypt and Europe 1909, Argentina, Peru, Panama and Mexico, 1910, Europe, Siberia and Mongolia, 1912; Peru, 1913; Minn., 1915; Dakotas, Minn., Fla., 1916; Tenn., Okla., 1917; Fla., 1918. Internat. Middletown St. H. Hosp., 1894-96; Associate in Anthropol., State Patholog. Inst., N. Y., 1896-99.; in charge physical anthrop. Hyde Expdn. Am. Mus. Nat. Hist., 1899-1903; asst. curator in charge div. phys. anthropology, U. S. Nat. Mus., 1903-10, curator, 1910 -. Fellow A. A. A. S. (pres. sec. H, 1918); mem. Assn. Am. Anatomists, Am. Anthropol. Assn., Washington Anthropol. (ex-pres.), Biol. and Med. socs., Wash. Acad. of Sci. (vice-pres. 1917-19); fellow Am. Acad. of Arts and Sci's.; mem. Amer. Philos. Soc., Hon. fellow R. Anthropol. Inst. Gr. Brit. & Ire.; Corr. memb. Bohemian Ethnol. Soc.; R. Bohemian Assn. of Sc's.; foreign memb. Bohemian Acad.; Assoc. memb. Paris Société d'Anthropologie; corr. mem. Anthropol. Gesellsch. Vienna, Soc. Portuguesa d'Antrop. e Etnol., Porto; Soc. des Americanistes Paris; Soc. Italiana di Antropologia Sec. Gen. XIX Internat. Cong. Americanists; Sec. Sec. Anthropol. II Pan-Am. Sc. Cong. Florence; Asso. editor Am. Naturalist, (1901-1908), founder and editor Amer. Jour. Phys. Anthropol. (1918 -.) Mem. Bd. Man. Am. Sch. of Research; judge Anthropol. Exhibits St. Louis and Jamestown Expos's; author exhibits in phys. anthrop. and prehistoric Amer. pathology Panama-Cal. Exp., San Diego, 1915-16. Author of paper and memoirs on anthropology of the defective classes; on physiol., med. and anthropol. observations among Indians; on antiquity of man in N. and S. America and in general; on the osteology of the Indian, Eskimo; on anthrop. of American whites and negroes, of Egyptians, Slavs, Russians; on research work in Peru, Mex., Asia; on the genesis of the Amer. Indian; on History of Phys. Anthropol. in America, and on Anthropometry. (bibliog. up to 1918 in Amer. J. Phys. Anthropol., I, 1918). Address: U. S. National Museum, Washington, D. C.; home, 2900 Tilden St., N. W. Washington, D. C.

mem. Internat. Comm. on Anthropol.

ALES HRDLICKA

Curator, Division of Physical Anthropology.

Born at Humpolec, Bohemia, March 29, 1869.

Academic education in Bohemia. M.D. New York Eclectic College 1892; New York Homoe. College, 1894; Md. Allopathic State Bd., 1894; Hon. Sc.D. Prague University, 1920. Appointed Assistant Curator in Charge of the Division of Physical Anthropology 1903-1910 and has been Curator of that Division since 1910. Is a member of the Association of American Anatomists; American Anthropological Association (President since 1925), Washington Academy of Sciences, Archaeological Institution of America, National Academy of Sciences, American Philos. Society, and various other societies.

Hrdlicka

Feb 24 1905

Dear Prof. Holmes:

My work among the Apaches is at an end, and I shall leave tomorrow for the Pinal. My address for the next three weeks (until March 10) will be Sacaton, Pinal County, Arizona.

I have been wholly successful in what I wanted, except that, on account of almost constant rains, I could not reach White Mountain. If conditions permit I may return to that region at the end of my journey.

The camera which Mr Gill promised to send five days after my departure has not yet reached me, which I much regret, for I had numerous opportunities of getting good views and portraits.

I have secured a number of archeological specimens, which I sent to the Museum. They are all from the valley of the San Carlos River, in which are numerous remnants of ancient occupation. These remnants consist of square, moderate size dwellings, the walls of which were made of natural boulders, placed, mostly in two layers, virtually in a thick mass of adobes. From two to two-and-a-half feet of such walls are underground, and the rooms are wholly filled with what appear to be crumbings from the walls, drift and alluvium. All through the valley the people cremated their dead and buried the remaining bones in jars. I send you one such jar and contents entire; it was found in a hole digging

which I made to satisfy myself as to the nature of one of the ruins on the grounds of the Indian school. There is also much evidence that the people did much grinding; and there is an almost total absence of arrow points - even chips being scarce. Axes, however, are quite numerous. At least one of the ruins, that on the grounds of the school and extending therefrom, ought to be explored systematically. It contains the remnants of a settlement of about 200 dwellings and possibly more, and several low, mound-like elevations. Nearly all the specimens I send you came from this ruin. A few were donated by the Supt. and traders here, while the rest I collected in the stone piles removed by the Indians from a part of the ruin that was being converted into an orchard, and during the little digging. You will notice the great difference in the workmanship of the different classes of specimens. The Apaches all say that when they came into this valley (which was quite recently) the ruins were here as they are now, and they have no idea who were their builders. They have for the people the name "na-il-sch-ki-de", which means "old timers".

In the top of some of the ruins in the valley and more often next or near to them, the Apaches have built their khuvas. Wherever these dwellings have been abandoned and the brush burned or blown away, there is left a rounded or oval depression in the ground, of from 8 to 12 feet in diam-

eter and from 1 to 2 feet deep. This reminded me of what Dr Hough spoke of as having found last summer. The depression is the result of the scooping out by the women of the inside of their khuva and piling the earth about the base of the branches that make the dwelling, as a protection against wind and water. Occasionally even stones are piled up about the hut on the outside, for a similar purpose. Perhaps Dr Hough's depressions were of a similar origin, for some Apaches lived in that region.

I hear that there are numerous and well preserved cliff-dwellings on the Bonito river, southeast of here, near Solomonville.

Among other specimens, I got personally, from rock graves, three male and two female Apache skeletons. I send also numerous plants, some part or parts of which are used by the Indians as food or medicine. The only expense with all this is the little I need to give to the Indians who accompany me in gathering the plants.

Just as I thought of finishing my letter I received a notice that next Monday a wagon is going to try to reach the White river. If the weather is at all tolerable I shall utilize this opportunity; it will require less time and be less expensive than to go away and return later. I shall write again within a few days to let you know how I fared.

Very sincerely yours,

(signed)

A. Hrdlicka.

Kindly remember me to all at one of your meetings, which I miss very much!

VOLUME VIII

SECTION V CURRENT ARCHEOLOGICAL WORK.

W. H. H.

Extracts from the

ANNUAL REPORT OF THE SMITHSONIAN INSTITUTION
1901

"Annual Report of the Board of Regents of
the Smithsonian Institution
for the Year Ending June 30, 1901."

"Mr. William H. Holmes, the head curator of the Department of Anthropology, secured nearly 500 archaeological specimens from an ancient quarry in Union County, Illinois. He describes these objects as representing not only the rejected materials resulting from manufacture, including the various forms of unfinished and broken implements and the flakage, but also the tools used in quarrying and shaping, and in sharpening the implements used and made." (Page 57) (Appendix to the Secretary's Report - Appendix I)

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"Mr. W. H. Holmes, head curator of Anthropology, accompanied by Dr. W. A. Phillips, of the Field Columbian Museum, examined the extensive flint quarries in the vicinity of Mill Creek, Union County, Illinois, where he obtained a large number of implements and quarry rejects." (Page 60) (Appendix to the Secretary's Report - Appendix I)

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"A notable collection of chipped implements, teeth and bones of an extinct elephant, together with a remarkable series of teeth and bones of the mastodon, besides remains of buffalo, deer, horse, and other animals of the historic period, was obtained from a spring in the northeastern Indian Territory. The association of fossil remains with human implements was puzzling until a critical examination by Mr. W. H. Holmes, verified through the memory of an aged Indian chief, indicated that the spring was a shrine at which aboriginal hunters accumulated votive offerings.

"Other researches were carried on and several publications were prepared, as mentioned in detail in the Appendix." (Pages 21-22.) (Rept. of the Sec'y -- Bureau of American Ethnology)

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"On September 25 Prof. W. H. Holmes, of the National Museum, and Mr. De Lancey Gill, of the Bureau, repaired, under the auspices of the Bureau, to northeastern Indian Territory for the purpose of examining a spring reported by a correspondent to contain abundant bone and flint implements associated with bones of both modern and extinct animals. They were successful in obtaining (1) the finest collection of mammoth teeth thus far made in America; (2) one of the finest collections of mastodon teeth ever made, and

(3) the most striking collection of chipped arrow points, lance heads, and knives thus far made in a single locality in this country. They verified the reported association and were able to identify the spot as an aboriginal shrine to which the attention of the aborigines was probably directed by the gigantic teeth and bones of extinct animals, and at which sacrifices were made through several generations. During the same trip they visited Kimmswick, Mo., where also human relics are reported to occur in association with bones of extinct animals. Toward the close of the year Professor Holmes again visited this locality, and, with the assistance of Mr. Gerard Fowke, made a considerable collection for preservation in the Museum." (Page 43.) (Appendix II -- Report of the Bureau of American Ethnology)

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"During the year Prof. W. H. Holmes, now of the United States National Museum, completed the monograph on aboriginal pottery of Eastern United States, of which he prepared the first draft while an officer of the Bureau. Although primarily technologic, it forms an important addition to knowledge of aboriginal esthetics." (Page 47) (Appendix II)

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Review of Holmes' pottery book. (One paragraph)
(Page 48)

"Fossil Human Remains Found Near Lansing, Kansas."
(Pages 455-462) W. H. Holmes

1901

On September 25, 1901, accompanied by Mr. De Lancey Gill, of the Bureau, I visited, under the auspices of the Bureau, the northeastern Indian Territory for the purpose of examining a spring reported by a correspondent to contain abundant bone and flint implements associated with bones of both modern and extinct animals. We were successful in obtaining: (1) the finest collection of mammoth teeth thus far made in America; (2) one of the finest collection of mastodon teeth ever made; and (3) the most remarkable collection of chipped arrow points, lance heads, and knives of flint thus far made in a single locality in this country. The reported association of the ancient and modern traces was thus justified but I was able to identify the spot as an aboriginal shrine, to which the attention of the Indian tribes had probably been directed by exposures of the gigantic teeth and bones of extinct animals, and at which sacrifices were made through many generations. During the same trip we visited Kimmswick, Mo., where again human relics are reported to occur in association with bones of extinct animals. Toward the close of the year I again visited this locality, and, with the assistance of Mr. Gerard Fowke, made large collections for preservation in the Museum. It happened that the Director of the Bureau, Professor Powell, died while we were engaged in this work and I repaired at once to Washington.

Columbia, S. C., June 14, 1901.

Prof. W. H. Holmes,
Washington, D. C.

Dear Sir:-

I am directed by the Board of Trustees of the South Carolina College to convey to you their appreciation of your distinguished services in classifying and arranging for suitable display the Babcock collection of Indian relics.

At the stated meeting of the Board, held on the 11th inst. resolutions were passed thanking you and Prof. McGhee for the courtesy extended this college.

Very respectfully yours,

Margaret H. Rion.

Secy. B. I. S. C. C.

June 14, 1891

Prof. W. H. Holmes
Washington, D. C.
Dear Sir:

I am directed by the Board of Trustees of the Smithsonian Institution to convey to you their appreciation of your distinguished services in classifying and arranging the valuable collection of American birds. At the stated meeting of the Board, held on the 11th inst. resolutions were passed thanking you and Prof. McPherson for the courtesy extended to the college.

Very respectfully,
H. H. Henshaw
Secy. U. S. Nat. Mus.

WASHINGTON ACADEMY OF SCIENCES

WASHINGTON, D. C.

SECRETARY—FRANK BAKER,
ZOOLOGICAL PARK.

Jan. 18, 1901

Sir:

I have the honor to inform you that
at the meeting of the Academy held January
17, 1901, you were elected a Vice President
of that body to represent the Anthropolog-
ical Society for the ensuing year.

Very truly yours,

Frank Baker

Secretary.

Mr. W. H. Holmes,

National Museum,

City.

President of the same period of
1 The Water Color Club
2 The Literary Society and
3 the Anthropological Society
4 and vice president of the Academy.

1901

The current work of the Bureau continued that of previous years, consisting largely of attention to the researches, writing and publications of the various members of the staff. Personally, I gave much attention to archeological field work, a brief outline of which may be given in this place, although the outstanding enterprise of the latter part of the year, as well as of succeeding years was the preparation, installation and return to Washington of the elaborate ethnological exhibits contributed to the Louisiana Purchase Exposition at St. Louis, the Bureau and National Museum, working together in these interesting projects.

The requirements of the frequently recurring expositions were a great aid in developing the exhibits of the National Museum, and credit is given me for the introduction during previous years of a new feature -- a feature especially adapted for exposition display. This was the building of lay figure groups of the primitive tribes of the world, and more especially of the American Indians.

Asked by Mr. F. W. Lehmann, Chairman of the Committee on Anthropological Exhibits and Mr. F. W. True, representative of the Smithsonian Institution, to supply a plan for the exhibit at St. Louis, I submitted the following:

"Referring to your favor of July 20, 1901, already briefly acknowledged, I take the liberty of offering certain suggestions regarding plans for an anthropological exhibit at the Louisiana Exposition.

W. H. H.

Extracts from the

ANNUAL REPORT OF THE SMITHSONIAN INSTITUTION
1901

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"Summary of the Operations of the Year."

"Mr. W. H. Holmes, under the auspices of the Bureau of American Ethnology, and in company with Dr. W. A. Phillips, of the Field Columbian Museum, made a detailed examination of the extensive and important flint quarries in the vicinity of Mill Creek, Union County, Illinois, where prehistoric implements occur in great abundance." (Page 22)

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"In the Department of Anthropology the head curator, Mr. Holmes, has completed a report based on his own ethnological and archaeological observations in the far West during several years past; he has also nearly finished the manuscript and illustrations for a large work on the ancient pottery of the United States, begun some time ago, and has commenced an exhaustive report on the industries of mining and quarrying among the native tribes." (Page 26)

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"Report on the Department of Anthropology
For the Year 1900-1901"
(Pages 50-61)

"Seven papers on anthropological subjects have been furnished during the year by members of the staff of this department. Two are by the head curator, Mr. W. H. Holmes. One of these relates to the obsidian mines of Hidalgo, Mexico, while the other is a review of the evidence relating to early man in California, as furnished by the auriferous gravels."

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"Report on the Exhibit of the Department of Anthropology
at the Pan-American Exposition, Buffalo, New York, 1901"
(Pages 200-218)

"Groups of Lay Figures"

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"Flint Implements and Fossil Remains from a Sulphur Spring
at Afton, Indian Territory"
(Pages 233-252)

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"Classification and Arrangement of the Exhibits of
An Anthropological Museum"
(Pages 253-278)

Archæology

A CENTURY OF AMERICAN ARCHÆOLOGY.

BY PROF. WARREN K. MOOREHEAD.

(Concluded.)

Not a few, but a hundred reports upon every conceivable technical subject connected with ancient life in America issued for his benefit by public and private enterprise. The mysteries of strange peoples are gone, the darkness has become light. Only the hieroglyphics of Central America remain, and even these will shortly be read.

In 1870, but thirty years ago, the Mound-builders were supposed to represent a very high culture—to be civilized,—a culture equal to that of Central America. The Cliff-dwellers were unknown, although some travelers had observed the ruined as well as inhabited pueblos of the southwest. This is all changed. The Mound-builders are known to be a people in upper barbarism; considerably advanced over the plains and other hunting tribes, but yet far below the Mayas and Central American aborigines. The cultures of American prehistoric tribes have been localized. The remains of one section (when explored) denote a high, yet, withal, a barbaric, culture; and those of another region (perhaps near at hand) may denote a lower culture. Instead of the Mississippi Valley having been occupied by a "Race of Mound-builders," we find that there were numerous small tribes, some larger tribes, etc., but that each is distinguished from the other.

Aboriginal trade and commerce has been proven to have been extensive. In one group of mounds (Hopewell, Ross Co., Ohio), were found seventeen foreign substances. Obsidian from the Yellowstone region, copper from Lake Superior, and pearls and shells from the Florida coast, etc. This is but one of the many discoveries made.

The museums, thirty years ago, were few and poorly supported. I do not suppose that all of them combined contained half the collections now to be found in the American Museum of Natural History, New York. Yet this institution, great as it is, is but one of some eight truly great museums—and there are thirty lesser archæological museums. These buildings contain some millions of utensils, garments, weapons, ceremonials, ornaments, etc., representing every phase of prehistoric life in America. The long rows of cases, the groups, the models, etc., are so well arranged and labeled that even a superficial observer may understand.

In the importance and amount of work done, in the analytic study of arts, cultures, handiwork, etc., one man stands pre-eminent above the entire number of famous workers given. I have purposely

left him until the last. Prof. Holmes, head of Anthropology of the Smithsonian (having under his direction the Bureau of Ethnology, Department of Ethnology in the National Museum of Archæology in the Smithsonian proper) has done more, technically, for the science than any other of his able and distinguished confreres. He and Prof. Putnam are the most prominent of our anthropologists. There are some differences between the two men. Prof. Putnam is a great organizer. His reports are numerous, and will always be authoritative. Because of his numerous interests and the management of various museums simultaneously, he has not had opportunity to present such detailed studies as Prof. Holmes. Prof. Holmes' study of the quarry-sites, the method of marking stone implements, his observation upon textile fabrics and ceramics are models of clearness, thoroughness and technology. Holmes' refutation of the "American Glacial Man" must be accepted as final, and the efforts of lesser lights to prove that such a man existed in the United States cannot prevail. Holmes' recent paper, entitled "Stone Implements of the Potomac-Chesapeake Tidewater Province," is unexcelled in the range of archæological publications in America.

The preservation of monuments is now assured. Formerly they were destroyed. To day, Fort Ancient, The Serpent Mound, ruins in the southwest, and many more important monuments and sites are made (or are being made) into parks. Congress has now before it a bill to protect all prehistoric monuments situated upon public domain from the ravages of "relic collectors."

The present century may see the "filling in" of many gaps in our "prehistory." New things will be found out here and there. The language and folk lore of extinct tribes we can never ascertain, but there are other matters to engage our attention. Chief among the possibilities of the future is the study and identification of the stone "ornaments, ceremonials," etc., which fill our museums. Heretofore they have been considered "unknown," and the very term ceremonial is a confession that we do not know what they really were. Thousands of them exist in public and private collection, and their study should be undertaken.

An archæologic nomenclature is a necessity. We have over 1,000 separate implements of stone, shell, clay and bone—yet our names for these are neither proper nor scientific—indeed, for some of them, we have no names at all.

Archæology is not the dry, dull study that many imagine it. Our monuments, relics, etc., are peculiarly American. They can be made as interesting as those of Europe and Asia, or Africa. The study of these various things affords a pleasurable pursuit for men and women of culture, as well as a source of information in regard to our prehistoric past.



September 21, 1901

NATIVE PEOPLES AT WORLD'S FAIRS.

Some Points Which the Average Spectator Loses Sight Of.

An interesting sidelight was thrown upon the subject of native peoples in connection with world's fairs last night by Mr. W. H. Holmes, head curator of the Smithsonian institution. Mr. Holmes was passing through the city, on his way to Montesano, where he will inspect the famous mastodon beds at that place, with a view to obtaining valuable specimens for the institution which he represents. Incidentally, he called upon Chairman Lehmann, of the World's Fair committee on ethnology and anthropology, during the day, to inquire about the progress of that department of the exposition work. He was here some weeks ago, in company with W. J. McGee, both of whom gave Mr. Lehmann and his associates their views of the work before the department.

"Little thought seems to be given to how the peoples from strange places stand our climate, and the effects of many radical changes, when they consent to become a part of world's fairs' exhibits," said Mr. Holmes last night, at the Southern. "Do you know that the Esquimaux brought to the Pan-American succeeded, soon after their arrival in Buffalo, in contracting the measles, and that all of them had it? They had a terrible time for a while, battling with an ailment of which they knew nothing. They all pulled through, however, so far as I know, and immediately became the happiest people you ever saw. That is one of the puzzles that confronts the student of peoples. These little folk, who live where there seem to be none of the blessings which are bestowed upon the denizens of other parts of the globe, are as satisfied with their seal meat and blubber as if they dined off blue point dinners, and had the choicest viands. Those who have had opportunities to observe the peoples who come from the region of the pole must have noticed that they are remarkably happy and buoyant of spirits. At Buffalo, they seemed to regard the measles as a joke, after they had recovered, while at the Columbian exposition they paddled about in their native canoes, clad in their native furs, while the thermometer stood close to 100. It had to be done, in order to carry out the effect, and they did not murmur. Have you stopped to think what pluck it requires in a people whom you might expect to be dissatisfied and homesick?"

"On the other hand, take the people of the African village at Buffalo. They came from the tropics when the snow was on the ground, and have remained to see the recent cool snap on the lakes, which has set the acclimatized to shivering. They had never seen snow, nor ever heard of it. Yet they seem to have weathered the difficulties remarkably well. One might expect that such things would result in a high rate of mortality. But who stops to think that an 'exhibit' is liable to death? This also opens the additional question, to what extent are we responsible, if we bring native villages from the tropics and from the poles, if disease should break out among them, and we should be unable to send them home again. This, however, is merely a sidelight on the subject. What St. Louisans have to think about at present, is that Mr. Lehmann has evolved the most striking idea that has ever been used in exposition work. If his ethnological department can be developed along the lines he has laid down, it will be a wonderful historical achievement. It is the first time any exposition has planned to adequately represent the peoples of the world. It will be more far reaching in its results than the average person realizes. It is not to be regarded as a midway affair, never been known before. Science will gain know the peoples of the world as they have never been known before. Science will gain much. But the effect on the average man will be highly important.

"At present the remote places of the earth are being encroached upon everywhere by the march of progress. The peoples who can not hold their own among the strong nations of the earth are becoming largely political factors on the chessboard of the world. They are being moved, 'jumped,' exchanged, controlled, through the wars or diplomatic actions of their superiors. We

St. Louis Daily Globe

deal with them as the speculator deals with stocks. We know nothing about the people themselves. Their human qualities are too often lost sight of. Their true condition is unknown to us. What a fine thing it will be to invite the German, the Englishman, the Frenchman, the Italian, to look upon these peoples as a human spectacle. Their home life, their crude industries, their primitive arts—all these must be a revelation to many, and we shall have to readjust our ideas of those whose destinies we have largely to control. It will be one of the greatest achievements in the history of civilization."

Mr. Holmes is accompanied by Mr. De Lancy Gill, the chief illustrator for the Smithsonian institution. They will return from Montesano to-night, leaving to-morrow for the Indian Territory, where they have other archaeological fields to explore. They will not return to Washington for several weeks.

MISSOURI'S PREHISTORIC RACE.

PROF. HOLMES TO SEARCH FOR EVIDENCES OF ITS EXISTENCE.

Extensive Scientific Research to Be Made in the Mississippi Valley and in the Indian Territory—Fair Management Interested.

SPECIAL DISPATCH TO THE GLOBE-DEMOCRAT.

WASHINGTON, September 26.—Prof. William H. Holmes, curator of the department of archaeology and American antiquities in the national museum, has gone to Missouri and Indian Territory to conduct some scientific investigations. Claims have been repeatedly made by local scientists that fossil remains found south of St. Louis indicate that mammoths lived contemporaneously with the Indians of the Mississippi valley. Prof. Holmes will investigate recent finds in that vicinity, and study the conditions, with a view to establishing the facts for the benefit of science.

He is greatly interested in the St. Louis World's Fair, and some of the researches he makes may bring out material for an interesting exhibit for the Fair. He was consulted by the Fair management in connection with the ethnological exhibit for the Fair. Before his return to Washington he is expected to visit the northeastern corner of the Indian Territory, thirty-five or forty miles north of the town of Vinita, in the Cherokee nation. He goes there to investigate reports received from sources which he regards as trustworthy, to the effect that human remains and objects of human industry and workmanship have been unearthed there in association with the bones, tusks, etc., of the mammoth mastodon and other extinct animals of the glacial period.

In Europe, it is declared, there is no doubt whatever that men were contemporaries of the mammoth cave bear and the saber-toothed tiger, there having been left representations of all such animals incised on the bone, horn and mammoth ivory handles of spears and knives, relics of that period. In America, however, similar works are so few, and those few of a character so doubtful that, notwithstanding the evidences of the existence of human beings found in the Trenton (N. J.) gravel bank, it is regarded as somewhat doubtful whether the Indians were present in America during the mammoth and reindeer period.

In the event Prof. Holmes discovers human remains associated with those of the mammoth in such manner as to leave no doubt as to their genuineness, the question will be, in a measure, set at rest.

H.

SMITHSONIAN INSTITUTION
WASHINGTON, D. C.

ALL CORRESPONDENCE
SHOULD BE ADDRESSED
TO THE SECRETARY

S. P. LANGLEY.

March 21, 1902.

Dear Sir:

As you may be aware, the Smithsonian Institution, in 1899, awarded the Hodgkins gold medal to Professor James Dewar, of the Royal Institution, for his meritorious researches on the liquefaction and solidification of atmospheric air; for his investigations of the physical properties of substances in contact with liquid air, and for his discovery of the extraordinary magnetic properties of liquid oxygen.

It is now proposed to award another Hodgkins medal, provided it is determined that discoveries of sufficiently distinguished merit in regard to "the nature and properties of atmospheric air in connection with the welfare of man", - words, which, as you will see in the accompanying circular, are to be interpreted in the very widest sense, - have been made since the medal was awarded in 1899.

I therefore have the honor to invite you to serve on a committee to advise the Secretary whether it is desirable to have one of the Hodgkins gold medals struck and presented, and, if so, to whom.


The other gentlemen whom I am asking to serve on the committee are Mr. Richard Rathbun, Assistant Secretary of the Smithsonian Institution; Doctor A. Graham Bell, for Electricity; Doctor Charles D. Walcott, for Geology; Professor Simon Newcomb, for Astronomy; Doctor William Osler, and Doctor Theodore N. Gill, for Biology; Professor Cleveland Abbe, for Meteorology; Mr. S. W. Stratton, for Physics, and Doctor Ira Remsen, for Chemistry.

In view of the approaching meeting at Washington of the National Academy of Sciences, it has occurred to me that the opportunity thus afforded of assembling the members of the advisory committee will be a favorable one.

For your information I enclose a circular, previously mentioned, issued some years ago, setting forth in a general way the objects of the Hodgkins Fund and the scope of the work that may come within its recognition.

Trusting that you may see your way clear to accept this invitation, I am,

Very respectfully yours,



Secretary.

Mr. W. H. Holmes,
Smithsonian Institution,
Head Curator, Department of Anthropology, U.S. National
Museum.

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SMITHSONIAN INSTITUTION

WASHINGTON, D. C.

ALL CORRESPONDENCE
SHOULD BE ADDRESSED
TO THE SECRETARY

S. P. LANGLEY.

April // , 1902.

Dear Mr. Holmes:

I have frequently spoken to you of my personal interest in the cases illustrating the history or the evolution of measurements, both in space and time - or rather, I should say, the evolution of the idea in the human mind, that such things are measurable quantities, - and I have been speaking to Mr. Maynard about my hope that this thing, which I initiated, but to which I can no longer give my personal attention, should not be wholly discontinued.

My idea would be that in illustrating measurements of space, the case should contain the most archaic instruments, such as might be found among some primitive tribe, for determinations of length, of quantity, and of weight; and pass from this through secular periods of development down to the most recent Ruprecht balance, the most complete dividing engine, the most perfect measurement of cubic capacity; these latter possibly connected with the refinements of the latest exposition of the metric system.

Regarding time, you will remember, I had hoped to pass in the same way from the stick which the savage places in

Test No. 12345

I have been thinking about you a great deal lately.

It seems like a long time since we last spoke.

I hope you are well and happy.

I would like to see you very much.

That is all I have to say for now.

Write to me when you have a chance.

I am always your friend.

Yours truly,

John Doe

123 Main Street, New York, N.Y.

Phone 1234567

Enclosed is a small photograph of me.

I hope you like it.

With love,

John Doe

Latest address: 456 Elm Street, New York, N.Y.

Best regards,

John Doe

the sanās pointing to the direction in which the sun was when he planted it for the benefit of his unseen follower, down through the clepsydra, to the mediaeval watches and clocks, to the invention of the pendulum and the balance spring; through later ones, to the most recent refinements of the Schultz chronoscope, which gives the millionth part of one second.

I hope you can arrange that Mr. Maynard may be encouraged to write about these.

I speak of the above matters with special reference to the letter on the subject, which comes before me, addressed to Captain Davis. This is not quite apt to the case; for instance, in speaking of an early chronometer of American manufacture, because there were no really early chronometers of American manufacture; though it would be very well to have a recent one as an example of the best modern development.

I should like to have Mr. Maynard, with your permission, consider where these things could most likely be found, and prepare a letter or letters from me addressed to various departments of the Government service, where any such archaic instruments would be likely to be procurable, and to the War Department, asking information and help.

The work of the committee is to be continued
when the report is made to the committee
down to the committee. The committee is to be
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of the committee. The committee is to be continued
of the committee.

I have not only been a member of the committee
encouraged to work with me.
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Very truly yours,



Secretary.

Mr. W. H. Holmes,

Smithsonian Institution,

Head Curator, Department of Anthropology,

U. S. National Museum.

W-P

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Mr. W. W. Holmes,

Smithsonian Institution,

Washington, D. C.

D. C. 20560

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SMITHSONIAN INSTITUTION
BUREAU OF AMERICAN ETHNOLOGY

WASHINGTON, January 22, 1896.

My dear Holmes:

Your letter of the 3rd instant reached me just before my departure from the city for several days.

Your paper on "Textile Fabrics of Eastern United States" will appear in the thirteenth annual report, which is almost ready for the presses; the printing-office people are now setting type on the index to the report, and I have no doubt we will have the volume delivered just as soon as they can rush it through.

The fourteenth, fifteenth, and sixteenth annuals are also in the hands of the printer, and I learned a few days ago that the first of these would be taken up immediately after the type-setting on the thirteenth is finished. In the fifteenth your memoir on Stone Implements of the Tidewater Country occurs; the engravings of this volume have all been finished, but the manuscript is still in your hands, I believe, undergoing revision.

Your pottery paper was assigned to volume viii of Contributions, but it has become necessary to withdraw this on account of recent legislation governing the printing and distribution of public documents. If possible, I shall assign it to volume x of Contributions, and if this is not practicable I shall endeavor to give it a place in the sixteenth annual, making the latter a two-volume report. I have delayed the transmission of the eighth and

January 28, 1886.

My dear friend:

Your letter of the 17th instant reached me just before my

departure from the city for several days.

Your paper on "Textile Industries of Eastern United States" will

appear in the forthcoming annual report, which is almost ready for

the press; the printing-office people are now waiting for the

index to the report, and I have no doubt we will have the volume

delivered just as soon as they can get it through.

The Commission, I believe, will also be

the hands of the printer, and I ordered a few days ago for the

first of these books to be printed in the

thing on the subject is finished. In the first of your

on the subject of the Commission's

ings of this volume have all been finished, and the manuscript is

all in your hands, I believe, notwithstanding.

Your volume was assigned to volume 11 of Commission

Report, and it has been necessary to withdraw this on account of

recent legislation governing the printing and distribution of

the Commission. I believe, I shall assign it to volume 12 of

Commission, and in this is not possible I shall endeavor to

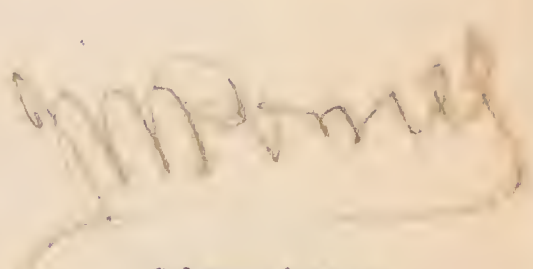
give it a place in the forthcoming annual, making the latter a two-

volume report. I have delayed the transmission of the original and

tenth volumes of Contributions, knowing that it would be impossible for the Printing Office to begin work on them; but as soon as the type-setters are farther advanced with the annual reports I shall have these volumes transmitted. To send them now would really save no time.

Trusting you are progressing well with your work at the Field-Columbian, believe me

Cordially yours,



Director.

Professor W. H. Holmes,
Field Columbian Museum,
Chicago, Illinois.

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WHERE SCIENCE HOLDS THE REINS

Men of Knowledge Have Much Control in Government Affairs.

The Biggest Money-spender Is a Scientist—The Man Who Invented Smokeless Powder—An Expert Who Makes Fire with Two Sticks—Proposal to Fetch the Surgeon from the Caspian Sea. A Delver in Human Antiquities.

The most noteworthy studies in regard to the antiquity of man upon the earth have been made by Prof. William H. Holmes, a very remarkable man, inasmuch as he is distinguished as a geologist, as an anthropologist, and as a painter. He is president of the National Academy of Fine Arts.

Prof. Holmes has dug far and wide and very deep for the remains of ancient man. Exceedingly ancient, too, he seems to be, in the judgment of the science of to-day. There is no question of the fact that he lived at the beginning of the Glacial Period, which was at least 600,000 years ago, and there is good evidence apparently to show that he was on the earth a long while before that—away back in the Pliocene, that is to say. But just where and when he ceased to be a monkey and became merely monkey-like, as he is to-day, nobody can state with exactness.

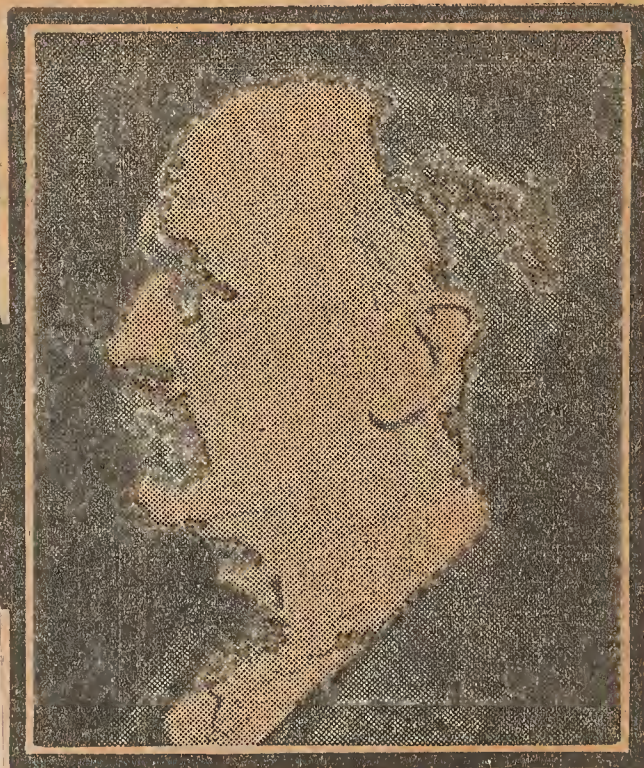
Prof. William H. Holmes' Work.

Prof. William H. Holmes is the government expert in all matters relating to the past history of mankind in America, and also in regard to the modern Indians. The object of the work of the bureau of ethnology, of which he is director, is to preserve the history of the American race—one of the four great races of mankind—which we have nearly destroyed. The task has to be performed now or never, inasmuch as the native tribes of this country are disappearing at the rate of three or four per year.

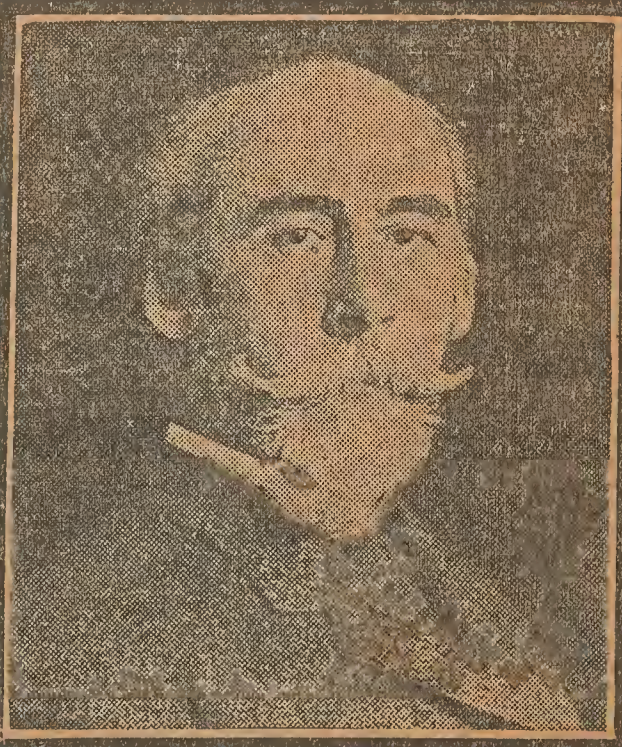
Prof. Holmes is a man of remarkable versatility. Having started life as a school teacher, he became attached, as a geologist, to the United States geological survey. Afterward he was curator of aboriginal pottery at the National Museum, and later assumed charge of the anthropological department in that establishment. He is one of the cleverest and most successful water-color painters now living, and is president of the National Academy of Fine Arts.

1910

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CHARLES D. WALCOTT,
SECRETARY OF SMITHSONIAN
INSTITUTION



PROF. W. H. HOLMES,
DIRECTOR OF THE
BUREAU OF
ETHNOLOGY

1910

Archeology.-- In this branch there are for examination caves, rock-shelters, mounds, village and camp sites, shell-heaps, refuse-heaps, mines and quarries, workshops, pueblos, cliff-ruins, cavate lodges, garden beds, irrigation works, forts, altars, shrines, springs, towers, stone mounds, cemeteries, camp sites, etc. While each of these requires individual treatment, depending on the conditions, and the judgment of the explorer may modify the methods, modern science requires that all data be reduced to measurement and graphic delineation. Thus the following points are essential: (1) Accurate location of the site on a map; (2) photographs of site; (3) plan, with measurement of areas to be worked; (4) stakes or datum marks placed; (5) removal of debris and location of specimens with reference to datum marks with the aid of camera and pencil; (6) field numbers of specimens and references to these numbers in the notebook; (7) care of specimens after collection.

Mounds are explored by means of trenches and then stripped of the upper part, which rarely contains anything of importance, but the contour of the mound is noted and one or more sections plotted. When the zone of deposits is reached a layer of earth is removed. The aspect of skeletons and other objects exposed is recorded and photographed and their position marked. Village sites near mounds are prolific in material illustrating the life of the former occupants. In the alluvial soil of the prairie states, wherever mounds abound such sites may be located by sounding the earth with an iron rod. The earth is then stripped off as in a mound, or it may be found preferable to excavate by "benching."

W. H. HOLMES' ARTICLES FROM THE HANDBOOK OF AMERICAN
INDIANS, BUREAU OF AMERICAN ETHNOLOGY, 1905.

A chief was, Church went with his Indian soldiers and only one white companion to capture him. When he reached the retreat, a rocky hill in the middle of a swamp, he sent the captives forward to divert the attention of Annawan's people. Church and his scouts then stole up, the noise they made being drowned by the sound of a pestle with which a woman was pounding corn, and jumped to the place where the arms were stacked. Annawan and his chief counselors, thus surprised and ignorant of the fewness of their assailants, gave themselves up and were bound. The fighting men, who were encamped near by, surrendered when they were told that the place was surrounded by English soldiers. Annawan brought the wampum belts and other regalia of King Philip, which he gave to Capt. Church as his conqueror, who had now overcome the last company that stood out against the English. Annawan's captor interceded to have his life spared, but the authorities at Plymouth, extracting from him a confession that he had put to death several English prisoners, some of them with torture, beheaded him in 1676 while Capt. Church was absent. (F. H.)

Anne. See *Queen Anne*.

Annugamok. A Nushagagmiut village on an E. tributary of Nushagak r., Alaska; pop. 214 in 1880.

Annugamok.—Petroff, 10th Census, Alaska, 17, 1884. **Annuganok.**—Nelson in 18th Rep. B. A. E., map, 1899. **Anoogamok.**—Petroff, Rep. on Alaska, 49, 1884.

Annuities. See *Agency System*.

Anoatok ('windy'). An Ita settlement at C. Inglefield, N. Greenland, the northernmost human habitation, lat. 78° 31'.

Anatoak.—Markham in Trans. Ethnol. Soc. Lond., 129, 1866. **Anoretō.**—Stein in Petermann's Mittheil., ix, map, 1902. **Aunatok.**—Kane, Arctic Explorer., II, 107, 1856. **Rensselaer Harbor.**—Ibid., I, 12.

Anoginajin (*anog* 'on both sides,' *i-* prefix, *na-* 'with feet,' *zing* 'to stand erect': 'he stands on both sides'). A band of the Wakpaatonwedan division of the Mdewakanton, named from its chief.

A-nog-i-na jin.—Neill, Hist. Minn., 144, note, 1858. **He-stands-both-sides.**—Ibid.

Anoixi. A village or division, probably of a southern Caddoan tribe, formerly situated near the Hot Springs country of Arkansas. Through this region De Soto's troops passed in the winter of 1541 on their way toward the place where De Soto later met his death. See Gentleman of Elvas (1557) in French, Hist. Coll. La., II, 182, 1850. Cf. Annocchy, a synonym of *Biloxi*. (A. C. F.)

Anonatea. A Huron village situated a league from Ihonatiria, in Ontario in 1637.—Jesuit Relation for 1637, 143, 1858. **Anenatea.**—Ibid., 141. **Anonatra.**—Ibid., 166 (misprint).

Anoritok ('without wind'). An Eskimo settlement in E. Greenland, lat. 61° 45'.—Meddelelser om Grönland, xxv, 23, 1902.

Aneretek.—Ausland, 162, 1886.

Anouala. According to Le Moyne (De Bry, map, 1591) a village in 1564 on a w. branch of St Johns r., Fla., in the territory occupied generally by tribes of the Timuquanan family.

Novola.—Jeffreys, Am. Atlas, 24, 1776.

Anovok. A Magemiut Eskimo village on a small river N. of Kuskokwim bay, Alaska; pop. 15 in 1890.

Annovokhamiut.—11th Census, Alaska, 109, 1893.

Anpanenikashika ('those who became human beings by the aid of the elk'). A Quapaw division.

An'pan e'nikaci'qa.—Dorsey in 15th Rep. B. A. E., 230, 1897. **Elk gens.**—Ibid., 229. **O'phū' enikaci'qa.**—Ibid.

Ansactoy. A village, probably of a part of the Patwin division of the Copehan family which formerly lived in Napa and Yolo cos., Cal. It concluded a treaty of peace with Gov. Vallejo in 1836.—Bancroft, Hist. Cal., iv, 71, 1886.

Ansaimes. A village, said to have been Costanoan, in California; situated in the mountains 25 m. E. of the Mutsun, whom the inhabitants of this village attacked in 1799–1800.—Engelhardt, Franciscans in Cal., 397, 1897.

Absayme.—Taylor in Cal. Farmer, Nov. 23, 1860. **Ansaimas.**—Ibid.

Anskowinis (*Anskówinis*, 'narrow nose-bridge'). A local band of the Cheyenne, taking its name from a former chief. (J. M.)

Antap. A former Chumashan village at the mill near San Pedro, Ventura co., Cal.—Henshaw, Buenaventura MS. vocab., B. A. E., 1884.

Antigonishe. Mentioned as an Indian settlement on a river of the same name which rises in a lake near the coast of the Strait of Canso, in "the province and colony of New Scotland." It was probably on or near the site of the present Antigonishe, in Antigonishe co., Nova Scotia, and perhaps belonged to the Micmac.

Artigoniche.—Alcedo, Dic. Geog., I, 161, 1786.

Antiquity. The antiquity of man on the American continent is a subject of interest to the student of the aborigines as well as to the historian of the human race, and the various problems that arise with respect to it in the region N. of Mexico are receiving much scientific attention. As the tribes were without a system of writing available to scholars, knowledge of events that transpired before the Columbian discovery is limited to the rather indefinite testimony furnished by tradition, by the more definite but as yet fragmentary evidences of archeology, and by the internal evidence of general ethnological phenomena. The fact that the American Indians have ac-

W. H. HOLMES' ARTICLES FROM THE HANDBOOK OF AMERICAN
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quired such marked physical characteristics as to be regarded as a separate race of very considerable homogeneity from Alaska to Patagonia, is regarded as indicating a long and complete separation from their parental peoples. Similarly, the existence in America of numerous culture groups, measurably distinct one from another in language, social customs, religion, technology, and esthetics, is thought to indicate a long and more or less exclusive occupancy of independent areas. But as a criterion of age the testimony thus furnished lacks definiteness, since to one mind it may signify a short time, while to another it may suggest a very long period. Native historical records of even the most advanced tribes are hardly more to be relied on than tradition, and they prove of little service in determining the duration of occupancy of the continent by the race, or even in tracing the more recent course of events connected with the historic peoples. No one can speak with assurance, on the authority of either tradition or history, of events dating farther back than a few hundred years. Archeology, however, can furnish definite data with respect to antiquity; and, aided by geology and biology, this science is furnishing results of great value, although some of the greater problems encountered remain still unsolved, and must so remain indefinitely. During the first centuries of European occupancy of the continent, belief in the derivation of the native tribes from some Old World people in comparatively recent times was very general, and indeed the fallacy has not yet been entirely extinguished. This view was based on the apparently solid foundation of the Mosaic record and chronology as determined by Usher, and many works have been written in the attempt to determine the particular people from which the American tribes sprang. (See *Popular Fallacies*, and for various references consult Bancroft, *Native Races*, v, 1886; Winsor, *Narrative and Critical History*, i, 1884). The results of researches into the prehistoric archeology of the eastern continent during the last century, however, have cleared away the Usherian interpretation of events and established the fact of the great antiquity of man in the world. Later, investigations in America were taken up, and the conclusion was reached that the course of primitive history had been about the same on both continents. Observations that seemed to substantiate this conclusion were soon forthcoming and were readily accepted; but a more critical examination of the testimony shows its shortcomings and tends to hold final determinations in abeyance. It is clear that traces of early man are not so

plentiful in America as in Europe, and investigations have proceeded with painful slowness and much halting along the various lines of research. Attempts have been made to establish a chronology of events in various ways, but without definite result. The magnitude of the work accomplished in the building of mounds and other earthworks has been emphasized, the time requisite for the growth and decay upon these works of a succession of forests has been computed (see *Mounds*). The vast accumulations of midden deposits and the fact that the strata composing them seem to indicate a succession of occupancies by tribes of gradually advancing culture, beginning in savagery and ending in well-advanced barbarism, have impressed themselves on chronologists (see *Shell-heaps*). Striking physiographic mutations, such as changes of level and the consequent retreat or advance of the sea and changes in river courses since man began to dwell along their shores, have been carefully considered. Modifications of particular species of mollusks between the time of their first use on the shell-heap sites and the present time, and the development in one or more cases of new varieties, suggest very considerable antiquity. But the highest estimate of elapsed time based on these evidences does not exceed a few thousand years. Dall, after carefully weighing the evidence collected by himself in Alaska, reached the conclusion that the earliest midden deposits of the Aleutian ids. are probably as much as 3,000 years old. Going beyond this limit, the geological chronology must be appealed to, and we find no criteria by means of which calculations can be made in years until we reach the close of the Glacial epoch, which, according to those who venture to make estimates based on the erosion of river channels, was, in the states that border the St Lawrence basin, not more than 8,000 or 10,000 years ago (Winchell). Within this period, which in middle North America may properly be designated post-Glacial, there have been reported numerous traces of man so associated with the deposits of that time as to make them measurably valuable in chronological studies; but these evidences come within the province of the geologist rather than of the archeologist, and findings not subjected to critical examination by geologists having special training in the particular field may well be placed in the doubtful category.

Post-Glacial rivers, in cutting their channels through the various deposits to their present level, have in some cases left a succession of flood-plain terraces in which remains of man and his works are embedded. These terraces afford rather imperfect means of subdivid-

over

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ing post-Glacial time, but under discriminating observation may be expected to furnish valuable data to the chronologist. The river terraces at Trenton, N. J., for example, formed largely of gravel accumulated at the period when the southern margin of the ice sheet was retreating northward beyond the Delaware valley, have been the subject of careful and prolonged investigation. At the points where traces of man have been reported the section of these deposits shows generally beneath the soil a few feet of superficial sands of uncertain age, passing down rather abruptly into a more or less uniform deposit of coarse gravel that reaches in places a depth of 30 feet or more. On and near the surface are found village sites and other traces of occupancy by the Indian tribes. Beneath the soil, extending throughout the sand layers, stone implements and the refuse of implement-making occur; but the testimony of these finds can have little value in chronology, since the age of the deposits inclosing them remains in doubt. From the Glacial gravels proper there has been recovered a single object to which weight as evidence of human presence during their accumulation is attached; this is a tubular bone, regarded as part of a human femur and said to show glacial striæ and traces of human workmanship, found at a depth of 21 feet. On this object the claim for the Glacial antiquity of man in the Delaware valley and on the Atlantic slope practically rests (Putnam, Mercer, Wright, Abbott, Hrdlicka, Holmes). Other finds E. of the Alleghenies lacking scientific verification furnish no reliable index of time. In a post-Glacial terrace on the S. shore of Lake Ontario the remains of a hearth were discovered at a depth of 22 feet by Mr Tomlinson in digging a well, apparently indicating early aboriginal occupancy of the St Lawrence basin (Gilbert). From the Glacial or immediately post-Glacial deposits of Ohio a number of articles of human workmanship have been reported: A grooved ax from a well 22 feet beneath the surface, near New London (Claypole); a chipped object of waster type at Newcomerstown, at a depth of 16 feet in Glacial gravels (Wright, Holmes); chipped stones in gravels, one at Madisonville at a depth of 8 feet, and another at Loveland at a depth of 30 feet (Metz, Putnam, Wright, Holmes). At Little Falls, Minn., flood-plain deposits of sand and gravel are found to contain many artificial objects of quartz. This flood plain is believed by some to have been finally abandoned by the Mississippi well back toward the close of the Glacial period in the valley (Brower, Winchell, Upham), but that

these finds warrant definite conclusions as to time is seriously questioned by Chamberlin. In a Missouri r. bench near Lansing, Kans., portions of a human skeleton were recently found at a depth of 20 feet, but geologists are not agreed as to the age of the formation (see *Lansing Man*). At Clayton, Mo., in a deposit believed to belong to the loess, at a depth of 14 feet, a well-finished grooved ax was found (Peterson). In the Basin Range region between the Rocky mts. and the Sierras, two discoveries that seem to bear on the antiquity of human occupancy have been reported: In a silt deposit in Walker r. valley, Nev., believed to be of Glacial age, an obsidian implement was obtained at a depth of 25 feet (McGee); at Nampa, Idaho, a clay image is reported to have been brought up by a sand pump from a depth of 320 feet in alternating beds of clay and quicksand underlying a lava flow of late Tertiary or early Glacial age (Wright, Emmons; see *Nampa Image*). Questions are raised by a number of geologists respecting the value of these finds (McGee). The most extraordinary discoveries of human remains in connection with geological formations are those from the auriferous gravels of California (Whitney, Holmes). These finds are numerous and are reported from many localities and from deposits covering a wide range of time. So convincing did the evidence appear to Whitney, state geologist of California from 1860 to 1874, that he accepted without hesitation the conclusion that man had occupied the auriferous gravel region during pre-Glacial time, and other students of the subject still regard the testimony as convincing; but consideration of the extraordinary nature of the conclusions dependent on this evidence should cause even the most sanguine advocate of great human antiquity in America to hesitate (see *Calaveras Man*). Geologists are practically agreed that the gravels from which some at least of the relics of man are said to come are of Tertiary age. These relics represent a polished-stone culture corresponding closely to that of the modern tribes of the Pacific slope. Thus, man in America must have passed through the savage and well into the barbarous stage while the hypothetical earliest representative of the human race in the Old World, *Pithecanthropus erectus* of Dubois, was still running wild in the forests of Java, a half-regenerate Simian. Furthermore, the acceptance of the auriferous-gravel testimony makes it necessary to place the presence of man in America far back toward the beginning of the Tertiary age, a period to be reckoned not in tens but in hundreds of thousands of years. (See Smithsonian Rep. for 1899.) These and other equally striking consid-

erations suggest the wisdom of formulating conclusions with the utmost caution.

Caves and rock shelters representing various periods and offering dwelling places to the tribes that have come and gone, may reasonably be expected to contain traces of the peoples of all periods of occupancy; but the deposits forming their floors, with few exceptions, have not been very fully examined, and up to the present time have furnished no very tangible evidence of the presence of men beyond the limited period of the American Indian as known to us. The University of California has conducted excavations in a cave in the n. part of the state, and the discovery of bones that appear to have been shaped by human hands, associated with fossil fauna that probably represent early Glacial times, has been reported (Sinclair); but the result is not decisive. The apparent absence or dearth of ancient human remains in the caves of the country furnishes one of the strongest reasons for critically examining all testimony bearing on antiquity about which reasonable doubt can be raised. It is incredible that primitive man should have inhabited a country of caverns for ages without resorting at some period to their hospitable shelter; but research in this field is hardly begun, and evidence of a more conclusive nature may yet be forthcoming.

In view of the extent of the researches carried on in various fields with the object of adducing evidence on which to base a scheme of human chronology in America, decisive results are surprisingly meager, and the finds so far made, reputed to represent a vast period of time stretching forward from the middle Tertiary to the present, are characterized by so many defects of observation and record and so many apparent incongruities, biological, geological, and cultural, that the task of the chronologist is still largely before him.

For archeological investigations and scientific discussion relating to the antiquity of man within the limits of the United States, see Abbott (1) in Proc. Boston Soc. Nat. Hist., xxiii, 1888, (2) in Proc. A. A. A. S., xxxvii, 1888; Allen, Prehist. World, 1885; Bancroft, Native Races, iv, 1882; Becker in Bull. Geol. Soc. Am., ii, 1891; Blake in Jour. Geol., vii, no. 7, 1899; Brower, Memoirs, v, 1902; Chamberlin (1) in Jour. Geol., x, no. 7, 1902, (2) in The Dial, 1892; Claypole in Am. Geol., xviii, 1896; Dall (1) in Proc. Acad. Nat. Sci. Phila., 1899, (2) in Cont. N. Am. Ethnol., i, 1877; Emmons in Proc. Boston Soc. Nat. Hist., xxiv, 1889; Farrand, Basis of Am. Hist., 1904; Foster, Prehist. Races, 1878; Fowke, Archeol. Hist. Ohio, 1902; Gilbert in Am. Anthropol., ii, 1889; Haynes in Winsor,

Narr. and Crit. Hist. Am., i, 1889; Holmes (1) in Rep. Smithson. Inst. 1899, 1901, (2) *ibid.* 1902, 1903, (3) in Jour. Geol., i, nos. 1, 2, 1893, (4) in Am. Geol., xi, no. 4, 1893, (5) in Science, Nov. 25, 1892, and Jan. 25, 1893; Hrdlicka (1) in Am. Anthropol., n. s., v, no. 2, 1903, (2) in Bull. Am. Mus. Nat. Hist., xvi, 1902; Kummel in Proc. A. A. A. S., xlvii, 1897; Lapham in Smithson. Cont., vii, 1855; Lewis, *ibid.*, xxix, 1880; McGee (1) in Am. Anthropol., ii, no. 4, 1889; v, no. 4, 1892; vi, no. 1, 1893, (2) in Pop. Sci. Mo., Nov., 1888, (3) in Am. Antiqu., xiii, no. 7, 1891; Mercer (1) in Proc. A. A. A. S., xlvii, 1897, (2) in Am. Nat., xxvii, 1893, (3) in Pubs. Univ. of Pa., vi, 1897; Morse in Proc. A. A. A. S., xxxiii, 1884; Munro, Archaeol. and False Antiqu., 1905; Nadaillac, Prehist. America, 1884; Peterson in Records of Past, ii, pt. 1, 1903; Powell in The Forum, 1890; Putnam (1) in Proc. Boston Soc. Nat. Hist., xxi, 1881-83; xxii, 1885-88, (2) in Peabody Mus. Reps., ix-xxxvii, 1876-1904, (3) in Proc. A. A. A. S., xlvii, 1897, (4) in Rep. Am. Mus. Nat. Hist. 1899, 1900; Salisbury (1) in Proc. A. A. A. S., xlvii, 1897, (2) in Science, Dec. 31, 1897; Shaler in Peabody Mus. Rep., ii, no. 1, 1877; Sinclair in Pub. Univ. Cal., ii, no. 1, 1904; Skertchley in Jour. Anthropol. Inst., xvii, 1888; Squier and Davis, Smithson. Cont., i, 1848; Thomas (1) Hist. N. Am., ii, 1904, (2) in 12th Rep. B. A. E., 1894, (3) Introd. Study of N. Am. Arch., 1903; Upham in Science, Aug., 1902; Whitney, Auriferous Gravels of the Sierra Nevada, 1879; Williston in Science, Aug., 1902; Winchell (1) in Am. Geol., Sept., 1902, (2) in Bull. Geol. Soc. Am., xiv, 1903; Wright, (1) Man and the Glacial Period, 1895, (2) Ice Age, 1889, (3) in Pop. Sci. Mo., May, 1893, (4) in Proc. Boston Soc. Nat. Hist., xxiii, 1888, (5) in Rec. of the Past, ii, 1903; iv, 1905; Wyman in Mem. Peabody Acad. Sci., i, no. 4, 1875.

The progress of opinion and research relating to the origin, antiquity, and early history of the American tribes is recorded in a vast body of literature fully cited, until within recent years, by Bancroft in Native Races, iv, 1882, and Haynes in Winsor's Narrative and Critical History, i, 1884. (w. ii. ii.)

Antler. See *Bone-work*.

Anu. The Red-ant clan of the Ala (Horn) phratry of the Hopi.

An-namu.—Voth, Traditions of the Hopi, 37, 1905.
A'-nü wüñ-wü.—Fewkes in Am. Anthropol., vii, 401, 1894 (*wüñ-wü* = 'clan').

Anuenes (*Anuē'nes*). A gens of the Nanaimo.—Boas in 5th Rep. N. W. Tribes, 32, 1889.

Anvik. A Kaiyukhotana village at the junction of Anvik and Yukon rs., Alaska. Pop. in 1844, 120; in 1880, 95;

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Argillite (slate). This material, which is much diversified in character, was in very general use by the tribes N. of Mexico for the manufacture of utensils, implements, and ornaments, and for carvings in general. The typical slates, characterized by their decided foliate structure, were used to some extent for implements; but the more massive varieties, such as the greenish striped slates of the Eastern states, the argillite of New Jersey, Pennsylvania, and the states to the S., and the black slate of the N. W. coast were usually preferred for polished implements and carvings. Argillite was much used by the tribes of the Delaware and Susquehanna valleys, and an ancient quarry of this material, situated at Point Pleasant, Pa., has been described by Mercer (see *Mines and Quarries*). Material from this and other quarries in the Appalachian region was used mainly for flaked implements, including leaf-shaped blades, knives, and arrow and spear heads, and these are widely distributed over the Middle Atlantic states. The fine-grained greenish and striped slates of the Eastern and Middle states and Canada were extensively used in the manufacture of several varieties of objects of somewhat problematic use, including so-called banner-stones, bird-stones, and perforated tablets. It is probable that, like the green agates and jadeites of Mexico, some varieties of this stone had special significance with the native tribes. The tribes of the N. W. coast employ a fine-grained slate in their very artistic carvings, which the Haida obtain chiefly from deposits on Slate Cr., Queen Charlotte Ids. This slate has the desirable qualities of being soft and easily carved when freshly quarried, and of growing harder with time. It is black and takes an excellent polish (Niblack). See *Sculpture and Carving, Totem-poles*.

References to the use of argillite and slate occur in many works relating to ethnologic and archeologic subjects, but are not sufficiently important to be given in full. Worthy of special mention are Abbott, *Prim. Industry*, 1881; Holmes in 15th Rep. B. A. E., 1897; Mercer in *Pubs. Univ. Penn.*, vi, 1897; Niblack in *Rep. Nat. Mus.* 1888, 1890; Rau in *Smithson. Rep.* 1872, 1873; Squier and Davis in *Smithson. Cont.*, i, 1848. (W. H. H.)

Arrows, Bows, and Quivers. The bow and arrow was the most useful and uni-

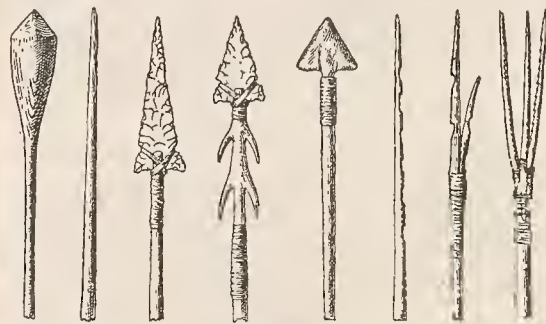


TYPICAL QUIVER; NAVAHO

versal weapon and implement of the chase possessed by the Indians N. of Mexico for striking or piercing distant objects.

ARROWS.—A complete Indian arrow is made up of six parts: Head, shaft, foreshaft, shaftment, feathering, and nock. These differ in material, form, measurement,

decoration, and assemblage, according to individuals, locality, and tribe. Arrowheads have three parts: Body, tang, and barbs. There are two kinds of arrowheads, the blunt and the sharp. Blunt heads are for stunning, being top-shaped. The Ute, Paiute, and others tied short sticks crosswise on the end of the shafts of boys' arrows for killing birds. Sharp



TYPES OF ARROWHEADS

arrowheads are of two classes, the lanceolate, which can be withdrawn, and the sagittate, intended for holding game or for rankling in the wound. The former are used on hunting, the latter on war or retrieving arrows. In the S. W. a sharpened foreshaft of hard wood serves for the head. Arctic and N. W. coast arrows have heads of ivory, bone, wood, or copper, as well as of stone; elsewhere they are more generally of stone, chipped or polished. Many of the arrowheads from those two areas are either two-pronged, three-pronged, or harpoon-shaped. The head is attached to the shaft or foreshaft by lashing with sinew, by riveting, or with gum. Among the Eskimo the barbed head of bone is stuck loosely into a socket on the shaft, so that this will come out and the head rankle in the wound. The barbs of the ordinary chipped head are usually alike on both sides, but in the long examples from ivory, bone, or wood the barbing is either bilateral or unilateral, one-barbed or many-barbed, alike on the two sides or different. In addition to their use in hunting and in war, arrows are commonly used in games and ceremonies. Among certain Hopi priesthoods arrowheads are tied to bandoleers as ornaments, and among the Zuni they are frequently attached to fetishes.

Arrowshafts of the simplest kind are reeds, canes, or stems of wood. In the Arctic region they are made of driftwood or are bits of bone lashed together, and are rather short, owing to the scarcity of material. The foreshaft is a piece of ivory, bone, or heavy wood. Among the Eskimo foreshafts are of bone or ivory on wooden shafts; in California, of hard wood on shafts of pithy or other light wood; from California across the continent to Florida, of hard wood on cane

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backed bows were made on bodies of driftwood. Asiatic influence is apparent in them. (See Boas in 6th Rep. B. A. E., 399-669, 1884; Murdoch in 9th Rep. B. A. E., 133-617, 1887, and Rep. Nat. Mus. for 1884, 307-316.)

2. *Northern Athapaskan*.—Long, straight bows of willow or birch, with wooden wrist-guards projecting from the belly.

3. *St. Lawrence and Eastern United States*.—Self-bows of ash, second-growth hickory, osage orange (bois d'arc), oak, or other hard wood.

4. *Gulf States*.—Long bows, rectangular in section, of walnut or other hard wood.

5. *Rocky mts.*—(1) Self-bow of osage orange or other hard wood; (2) a compound bow of several strips of buffalo horn lashed together and strengthened.

6. *North Pacific coast*.—Bows with rounded grip and flat wings, usually made of yew or cedar.

7. *Fraser-Columbia region*.—Similar to No. 6, but with wings much shorter and the nocks curved sharply outward.

8. *Interior basin*.—A long slender stick of rude form; many are strengthened by means of a sinew lining on the back and cross wrappings.

9. *California*.—Like No. 7, but neatly lined with sinew and often prettily decorated.

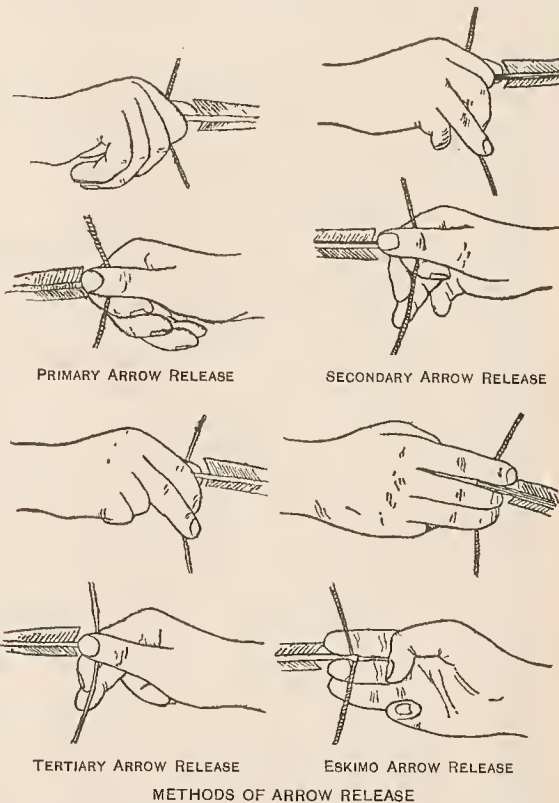
10. *Southwest*.—Like No. 8, but seldom sinew-lined (Navaho). Small painted bows are used much in ceremony, especially by the Pueblos, who deposit them in shrines. In the s. part of this area long cottonwood bows with cross lashing are employed by Yuman and Piman tribes. The Jicarillas make a cupid's bow, strengthened with bands of sinew wrapping.

The bows E. of the Rockies have little distinction of parts, but the w. Eskimo and Pacific slope varieties have flat wings, and the former shows connection with Asia. The nocks are in some tribes alike, but among the Plains Indians the lower nock is cut in at one side only. Bow-strings are of sinew cord tied at one end and looped at the other.

WRIST-GUARD.—When the bowman's left arm was exposed he wore a wrist-guard of hide or other suitable material to break the blow of the released string. Wrist-guards were also decorated for ceremonial purposes.

ARROW RELEASE.—Arrow release is the way of holding the nock and letting loose the arrow in shooting. Morse describes four methods among the tribes N. of Mexico, the first three being Indian: (1) Primary release, in which the nock is held between the thumb and the first joint of the forefinger; (2) secondary release, in

which the middle and the ring fingers are laid inside of the string; (3) tertiary release, in which the nock is held between the ends of the forefinger and the middle finger, while the first three fingers are hooked on the string; (4) the Mediterranean method, confined to the Eskimo, whose arrows have a flat nock, in which the string is drawn with the tips of the first, second, and third fingers, the nock being lightly held between the first and the second fingers. Morse finds



that among the North American tribes, the Navaho, Chippewa, Micmac, and Penobscot used the primary release; the Ottawa, Chippewa, and Zuñi the secondary; the Omaha, Arapaho, Cheyenne, Assiniboin, Comanche, Crows, Siksika, and some Navaho, the tertiary.

QUIVERS.—The form of the quiver depended on the size of the bow and arrows; the materials, determined by the region, are skin or wood. Sealskin quivers are used in the Arctic region; beautifully decorated examples of deerskin are common in Canada, also E. of the Rockies and in the Interior basin. On the Pacific coast cedar quivers are employed by the canoe-using tribes, and others make them of skins of the otter, mountain lion, or coyote.

In addition to the works cited under the subject *Arrowheads*, consult Cushing (1) in Proc. A. A. A. S., XLIV, 1896, (2) in Am. Anthropol., VIII, 1895; Culin, Am. Indian Games, 24th Rep. B. A. E., 1905; Mason, N. Am. Bows, Arrows, and Quiv-

Over

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ers, in Rep. Smithson. Inst. 1893, 1894; Murdoch, Study of Eskimo Bows, Rep. Nat. Mus. 1884, 1885; Morse, Arrow Release, in Bull. Essex Inst., 1885; Arrows and Arrow-makers, in Am. Anthropol., 45-74, 1891; also various Reports of the Bureau of American Ethnology. (o. t. m.)

Arroyo Grande. A Pima settlement in s. Arizona with 110 inhabitants in 1858. **Del Arroyo Grande.**—Bailey in Ind. Aff. Rep., 208, 1858.

Arseek. A tribe living in 1608 in the vicinity of the Sarapinagh, Nause, and Nanticoke (Smith, Hist. Va., 1, 175, repr. 1819). They are not noted on Smith's map, but the Nause and Nanticoke are, by which their location is indicated as on Nanticoke r., in Dorchester or Wicomico co., Md. (J. M.)

Arseek.—Bozman, Maryland, I, 12, 1837 (misprint). **Arsek.**—Purchas (1625), Pilgrimes, IV, 1713.

Arsuk. An Eskimo village in s. Greenland, w. of Cape Farewell, lat. 61°.—Nansen, First Crossing of Greenland, map, 1890.

Art. The term "art" is sometimes applied to the whole range of man's cultural activities, but as here employed it is intended to refer only to those elements of the arts which in the higher stages of culture come fully within the realm of taste and culminate in the ornamental and fine arts (see *Ornament*). Among primitive peoples many of these esthetic elements originate in religious symbolism. Among the tribes n. of Mexico such elements are exceedingly varied and important, and extend in some degree to all branches of the arts in which plastic, graphic, sculptural, constructional, and associative processes are applicable, as well as to the embellishment of the human person. These symbolic elements consist very largely of natural forms, especially of men and beasts, and of such natural phenomena as the sun, stars, lightning, and rain; and their introduction is probably due largely to the general belief that symbols carry with them something of the essence, something of the mystic influence of the beings and potencies which they are assumed to represent. In their introduction into art, however, these symbols are subject to esthetic influence and supervision, and are thus properly classed as embellishments. In use they are modified in form by the various conventionalizing agencies of technique, and a multitude of variants arise which connect with and shade into the great body of purely conventional decoration. Not infrequently, it is believed, the purely conventional designs originating in the esthetic impulse receive symbolic interpretations, giving rise to still greater complexity. Entering into the arts and subject to similar influences are

sentations which contribute to embellishment and to the development of pure esthetic phases of art. These elements, largely pictographic, contribute not only to the growth of the fine art, painting, but equally to the development of the recording art, writing. The place occupied by the religious, ideographic, and simply esthetic elements in the various arts of the northern tribes may be briefly reviewed:

(1) The building arts, employed in constructing dwellings, places of worship, etc., as practised n. of Mexico, although generally primitive, embody various religious and esthetic elements in their most essential elaborations. As a rule, they are not evolved from the constructive features of the art, nor are they expressed in terms of construction. The primitive builder of houses depends mainly on the arts of the sculptor and the painter for his embellishments. Among Pueblo tribes, for example, conventional figures and animals are painted on the walls of the kivas, and on their floors elaborate symbolic figures and religious personages are represented in dry-painting (q. v.); and the same time nonsignificant pictorial subjects, as well as purely decorative designs, occur now and then on the interior walls and the latter are worked out in crude patterns in the stonework of the exterior. Though the buildings themselves present many interesting features of form and proportion, construction has not been brought to any considerable degree under the supervision of taste. The dwellings of primitive tribes in various parts of the country, constructed of reeds, grass, sod, bark, mats, and the like, are by no means devoid of that comeliness which results from careful construction, but they show few definite traces of the influence of either symbolism or the esthetic idea. The skin tipis of the Plains tribes present tempting surfaces to the artist, and are frequently tastefully adorned with heraldic and religious symbols and with graphic designs painted in brilliant colors, while the grass lodge is embellished by emphasizing certain constructive features in rhythmic order after the manner of basketry. The houses of the N. W. coast tribes, built wholly of wood, are furnished within with carved and painted pillars, whose main function is practical, since they serve to support the roof, while the totem-poles and mortuary columns outside, still more elaborately embellished, are essentially emblematic. The walls both within and without are often covered with brilliantly colored designs embodying mythologic conceptions. Although these structures depend for their effect largely on the work of the sculptor and the painter, they show decided archi-

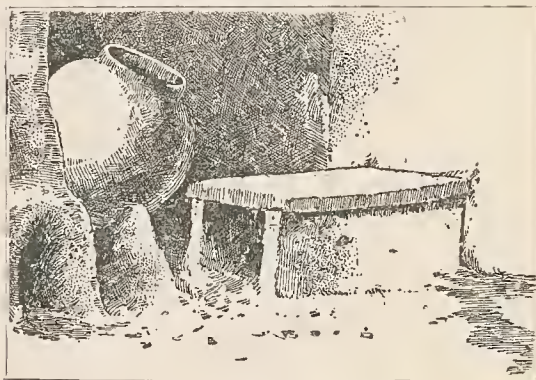
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Baking stones. A name applied to a numerous class of prehistoric stone relics found principally on inhabited sites in s. California. They are flattish, often rudely rectangular or somewhat oval plates, sometimes convex beneath and slightly concave above, and rare specimens have obscure rims. Usually they are made of soapstone, and often show traces of use over fire. They rarely exceed a foot in length, are somewhat less in width, and perhaps an inch in average thickness. The characteristic feature of these plates is a roughly made perforation at the middle of one end, giving the appearance of a huge pendant ornament. This perforation served, no doubt, to aid in handling the plate while hot. Some of these objects may have been boiling stones to be heated in the fire and suspended in a pot or basket of water for cooking purposes. This utensil passes imperceptibly into certain ladle-like forms, and these again into dippers, cups, bowls, and globular ollas in turn, the whole group forming part of the culinary outfit. A remarkable ladle-like object of gray diorite was obtained from the auriferous gravels 16 feet below the surface in Placer co., Cal. It is superior in make to other kindred objects. The baking stones



PREHISTORIC BAKING PLATE;
CALIFORNIA (1-10)

of the Pueblo Indians, employed in making the wafer bread, are smooth, oblong slabs set over the fireplace. See Abbott in Surveys West of the 100th Merid., vii,



HOPÍ BAKING STONE. (MINDELEFF)

1879; Cushing, Zuñi Breadstuff, in Millstone, Nov. 1884; Holmes in Smithson. Rep. 1899, 1901; Mindeleff in 8th Rep. B. A. E., 1891. (W. H. H.)

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Anchor stones. The native tribes N. of Mexico used bark and skin boats, dug-outs, and, in the extreme S. W. and on the California coast, balsas; and in the use of these frail craft for purposes of travel, transportation, fishing, hunting, and warfare, the necessity for some means of anchorage was felt. In shallow waters with soft bottoms poles were often used; but of most general availability were stones that could be secured with a line and dropped from the vessel at any point. Commonly the stones thus used were

simply boulders or fragments of rock of proper weight, but in some cases the form was modified to facilitate attachment of the cord. A simple encircling groove, mere notches in the margins, or a rude perforation, sufficed for the purpose; the

former treatment gave to the utensil the appearance of a grooved hammer. Indeed, it probably often happened that these anchor stones were used as hammers or as mauls or sledges for heavy work when occasion required. It is observed also that some specimens have served as mortars or anvil stones, and no doubt also for grinding and shaping implements of stone. Stones of all available varieties were used, and the weight, so far as observed, rarely exceeds 40 or 50 pounds. The grooves or marginal notches were usually rudely pecked or chipped; but some show careful treatment, and in a number of cases a part or the whole of the surface of the stone has been worked down, probably for safety and convenience in handling, and in some cases as a result of the habit of reducing articles in common use to symmetrical and somewhat artistic shapes. Snyder records one case of the discovery of an anchor stone in an Indian grave. These stones are still used by Indians as well as by white people. Consult Snyder in *Smithson. Rep.* 1887, 1889; Rau in *Smithson. Cont.*, xxv, 1884. (W. H. H.)



ANCHOR STONE, ILLINOIS RIVER
(DIAMETER 12 IN.)



ANCHOR STONE IN USE
BY CHIPPEWA (12 1-2
IN. LONG)

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✧ **Calaveras Man.** During the early days of gold mining in California many relics of man and his implements and utensils were found embedded in the ancient river gravels from which the gold was washed. These remains were especially plentiful in Calaveras co., whence the name "Calaveras man," here employed. The gold-bearing gravels are largely of Tertiary age, although the conditions have been such that in places accumulations uniform in character with the older deposits have continued to the present time. Owing to this fact expert geologic discrimination is necessary in considering questions of age. The evidences of great antiquity, in many cases apparently almost conclusive, were accepted as satisfactory by J. D. Whitney, formerly state geologist of California; but the lack of expert observation or of actual record of the various finds reported makes extreme caution advisable, especially since the acceptance of the evidence necessitates conclusions widely at variance with the usual conception of the history of man, not only in America but throughout the world. The need of conservatism in dealing with this evidence is further emphasized by the fact that the human crania of the auriferous gravels are practically identical with the crania of the present California Indians, and



FRONTAL VIEW OF THE FRAGMENTARY CALAVERAS SKULL

it is also observed that the artifacts—the mortars and pestles, the implements and ornaments—found in the same connection correspond closely with those of the historic inhabitants of the Pacific slope. It is held by many students of human history that man already existed in some parts of the world in the late Tertiary—a period believed by conservative geologists to have closed hundreds of thousands of years ago. But few are ready to accept the conclusion, made necessary if the California testimony is fully sustained, that man had then reached the stage of culture characterized by the use of implements and ornaments of polished stone. In view of the somewhat defective nature of the testimony furnished, as well as the vast importance of the deductions depending on it, it is perhaps wise to suspend judgment until more systematic investigations can be made. The "Calaveras skull," which has had exceptional prominence in the discussion of this subject, is preserved in the Peabody Museum of Archaeology and Ethnology, at Cambridge, Mass. Notwithstanding the well-fortified statements of early writers to the effect that this relic came from the gravels of Bald mtn. at a depth of about 130 feet, there are good reasons for suspecting that it may have been derived from one of the limestone caves so numerous in the Calaveras region. It thus appears that the importance of this specimen, as a feature of the evidence, has probably been greatly overestimated.

For details relating to the auriferous-gravel testimony consult Becker in Bull. Geol. Soc. Am., II, 1891; Blake in Jour. of Geol., Oct.-Nov., 1899; Dall in Proc. Acad. Nat. Sci. Phila., 1899; Foster, Prehist. Races, 1878; Hanks, Deep Lying Gravels of Table Mtn., 1901; Holmes in Smithsonian Rep. 1899, 1901; Lindgren and Knowlton in Jour. of Geol., IV, 1896; Putnam in University of Cal. Publ., Dept. of Anthropol., 1905; Skertchley in Jour. Anthropol. Inst., May, 1888; Whitney in Mem. Mus. Comp. Zool., Harvard, VI, no. 1, 1879; Wright, Man and the Glacial Period, 1895. See *Antiquity, Archaeology*. (W. H. H.)

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Chalcedony. Under this head may be grouped a number of varieties of silica (see *Quartz*), including flint, chert, hornstone, jasper, agate, novaculite in part, onyx, carnelian, etc., most of which were used by the aborigines in the manufacture of flaked implements. The distinctions between these rocks have not been sharply drawn by mineralogists, and the archeologist must be content with grouping them according to their resemblance to recognized types. The term flint has come into somewhat general use among archeologists for the whole group, but this is not sanctioned by mineralogists. Chalcedony is a translucent and variously tinted indistinctly crystalline variety of silica. It is formed by infiltration in cavities in the older rocks, as a secondary product during decomposition of many rocks, and as accumulations of the siliceous residue from various organisms. It occurs as nodules distributed through sedimentary strata, as in the middle Mississippi valley; as thin, more or less interrupted layers, as in Wyandot cave, Indiana, and at Millcreek, Ill.; or as massive strata, as in Flint ridge, Ohio, and on the Peoria res., Ind. Ter. *Flint* (true flint), q. v., is formed as nodular segregations in chalky limestone, and is composed mainly of nearly amorphous silica and partially dissolved radiolaria and spicules of sponges. The colors are dark gray and brownish to nearly black, and somewhat translucent on thin edges. It occurs extensively in England, France, and n. w. Europe, and has recently been found in Arkansas and Texas, where it was used by the aborigines in making implements. *Chert*, as commonly recognized, differs from true flint in being lighter in color, as a rule, although variously tinted and less translucent. It occurs in the limestones of a wide range of geological formations. The best-known deposits utilized by the Indians are on the Peoria res., near Seneca, Mo., and at Millcreek, Ill. *Hornstone* is the term usually applied to varieties of chalcedony displaying peculiar horn-like characteristics of toughness and translucency. Much of the nodular chalcedony of the Ohio valley, extensively employed by the aborigines in the manufacture of implements and the blades and disks deposited in caches, has been known under this name. *Jasper* (q. v.) is a ferruginous variety of chalcedony, of red, yellow, and brownish tints. The greenish varieties are known as *prase*, and these when marked with red are called *bloodstone*. Numerous aboriginal quarries of jasper occur in e. Pennsylvania. *Agate* is a banded variety of chalcedony found

mainly in cavities in igneous rocks. The natural colors are white to gray, passing into various delicate tints. *Onyx* is a banded variety of agate, but owing to fancied similarities the name has been applied to certain calcareous deposits, as the so-called Mexican onyx.

Consult Dana, *System of Mineralogy*, 1892; Merrill, *Rocks, Rock-weathering and Soils*, 1897. See *Mines and Quarries, Stone-work.* (W. H. H. G. P. M.)

✱ Chlorite.—A soft, greenish, often blackish, mineral, related to the micas, much used by the aborigines for ornaments, ceremonial objects, and pipes. When polished it is in many cases not readily distinguished from steatite or soapstone save by its somewhat greater hardness. It occurs as a secondary mineral resulting from alteration of other species, as biotite, pyroxene, amphibolite, etc. See *Stone-work*. (W. H. H.)

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Jet, Lignite, Anthracite, Cannel coal. Carbonaceous materials used to some extent by Indians. Jet of excellent quality occurs in Colorado, and the Indians of the arid region employ it for jewelry and various carvings. Good examples of lignite ornaments were obtained by Fewkes from the ancient ruins of Arizona, and of jet by Pepper from the ruins of Chaco canyon, N. Mex. Among the latter is a well-sculptured frog decorated with inlaid designs in turquoise and shell. Cannel-coal objects are found in the Ohio valley mounds, but few specimens carved from

anthracite are known. A small, well-carved human head of jet-like stone was obtained by Smith from a shell heap on lower Frazer r., Brit. Col., and Niblack says that the N. W. coast tribes pulverize lignite and mix it with oil for paint.

Consult Fewkes in 22d Rep. B. A. E., 1903; Niblack in Rep. Nat. Mus. 1888, 1890; Pepper in Am. Anthrop., vii, 1905; Smith in Mem. Am. Mus. Nat. Hist., iv, 1903.

(W. H. H.)

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Chisels. Long, slender, celt-like implements of stone or hard varieties of bone,

with narrow cutting edge, and round, rectangular, elliptical, or half-elliptical in section. Those of stone, mainly prehistoric, are rarely more than a few inches in length. Some specimens are largest at the top, gradually tapering to the edge, but most of them decrease in size in each direction from near the middle. Some have hammer marks on the blunt end, others are polished at the top, while a few are sharp at both ends. It is probable that their primary intent was for woodworking, though they are numerous wherever steatite vessels were made, and the marks of their use are seen on the unfinished product and on the worked surfaces of the quarry face. These soapstone cutting tools have usually been flaked into the desired form, the edge only being carefully ground. In the lower Ohio valley and in the Southern states chisels are generally made of chert; toward the N., where glacial material is easily procured, they are of diorite, syenite, or other tough rock. Chisels of stone were in common use among the woodworking tribes of the N. W. coast, but these are now almost wholly superseded by chisels of metal. While not so abundant as celts (q. v.), from which they can not always be distinguished, they have practically the same distribution. See Fowke in 13th Rep. B. A. E., 1896; Holmes in 15th Rep. B. A. E., 1897; Rau in Smithson. Cont., xxii, 1876.



STONE CHISEL;
ALA. (1-5)

(W. H. H. G. F.)

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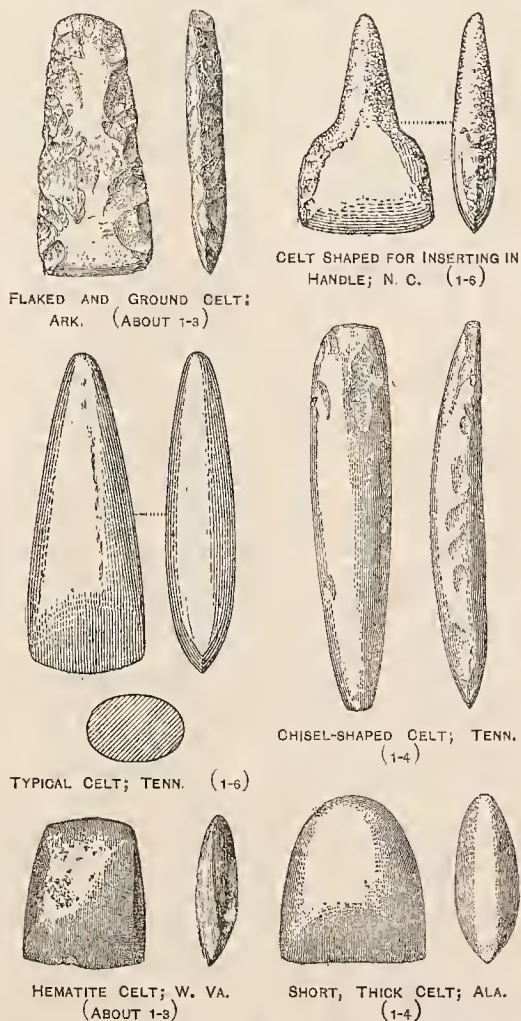
mtn. and the Cibolleta land grant take their name from the settlement.

(F. W. H.)

Ceballeta.—Hughes, Doniphan's Exped., 126, 1848. **Cebellitita.**—Parke, map New Mexico, 1851. **Cebolleta.**—Hughes, Doniphan's Exped., map, 1848. **Cebolleta.**—Ibid., 146. **Cebolletta.**—Buschmann, Neu-Mexico, 247, 1858 (misquoting Abert). **Cevolleta.**—Brevoort, New Mexico, 22, 1874. **Cevolletto.**—Domenech, Deserts of N. A., II, 7, 1860. **Cibaleta.**—Buschmann, Neu-Mexico, 247, 1858. **Cibaletta.**—Ibid., 247. **Cibolletta.**—Am. Ethnol. Soc. Trans., II, map, 1848. **Cibolletta.**—Abert in Emory, Reconnaissance, 468, 1848. **Cibolletta.**—Ibid., 465; Johnston, *ibid.*, 589. **Seboyeta.**—U. S. Land Off. map, 1903. **Sevolleta.**—Cortez (1799) in Pac. R. R. Rep., III, pt. 3, 119, 1856. **Sibolletta.**—Folsom, Mexico, map, 1842.

Ceca. Mentioned by Oñate (Doc. Inéd., xvi, 114, 1871) as a pueblo of the Jemez in New Mexico in 1598. The name can not be identified with the present native name of any ruined settlement in the vicinity. **Leecca.**—Oñate, *op. cit.*, 102.

Celts. Ungrooved axes or hatchets of stone, metal, or other hard material. It is uncertain whether the name is de-



rived from the Latin *celtis*, 'chisel,' to which the implement bears some resemblance, or from the Welsh *cellt*, 'a flint stone.' The celts range in weight from less than half an ounce to more than 20 pounds, while the diversity of form is very great. Their distribution is more general than that of the grooved ax. The

primary purpose was probably that of hatchet, but in one shape or another they served as adzes, chisels, scrapers, skinning knives, meat cutters, and weapons. Many have the surface roughened by pecking at the top, which was inserted in a cavity cut in a wooden club and secured with gum or glue; in others, this roughening was around the middle, to give firmer grip to a with the handle; still others wrapped perhaps in a piece of buckskin or some such substance to prevent slipping, were held in the hand. Some specimens were set in the end of a short piece of bone or antler, which, in turn, acting as a buffer, was attached to a handle of wood in the fashion of a hatchet, an adze or a plane. The smallest specimens, especially those made of hematite which usually have the scraper-form edge, were similarly set in the end of a longer piece of bone or antler, and used as knives or scrapers. Celts, in their various patterns, were among the most important implements known to primitive man.

Celts made of flint, jasper, and other brittle stone are shaped mainly by flaking. In most, the edge is more or less sharpened by grinding, and sometimes the entire implement is partially smoothed in the same way. They are common along the Atlantic coast, where argillite and rhyolite are easily procured; and the same is true of the Kanawha valley where the black flint outcrops so abundantly. Along the Mississippi river, in Arkansas and Mississippi, are found numerous specimens which have been chipped from yellow jasper and then ground until the angles formed by the facets are nearly obliterated and the lower part of the blade attains a high degree of polish. These are mostly small, and approach more closely the European celts with rectangular section than any others found in America. They are sometimes classed with chisels. See *Adzes, Axes, Chisels, Copper, Hatchets, Stone-work, Tomahawks*.

Celts are described or briefly referred to and illustrated in numerous works on archeologic subjects. Among these are Abbott, *Prim. Indus.*, 1881; Fowke (1) *Archaeol. Hist. Ohio*, 1902, (2) in 13th Rep. B. A. E., 1896; Holmes in 15th Rep. B. A. E., 1897; Jones, *Antiq. So. Inds.*, 1873; Moore, various memoirs in *Jour. Acad. Nat. Sci. Phila.*, 1894-1905; Moorehead, *Prehist. Impls.*, 1900; Rau in *Smithson. Cont.*, xxii, 1876; Thruston, *Antiq. Tenn.*, 1897. (G. F. W. H. H.)

Cements.—The Indians used cements of animal, vegetal, and mineral origin, and sometimes combined two of these or added mineral substances for coloring. Animal cement was obtained by the Yokuts of California by boiling the joints of various animals and combining the product with

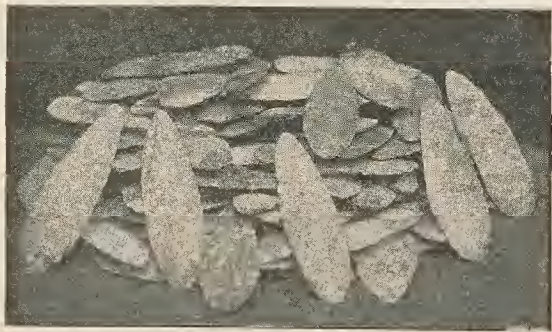
Cachaymon. A village or tribe, possibly Caddoan, mentioned by Iberville (Margry, *Déc.*, IV, 178, 1880), in the account of his voyage up the Mississippi in 1699, as being on or near Red r. of Louisiana. Possibly identical with Cahinnio.

Cache disks and blades. The term *cachie* is applied to certain forms of storage of property (see *Storage*), and in archeology it is employed to designate more especially certain deposits of implements and other objects, mainly of stone and metal, the most noteworthy consisting of flaked flint blades and disks. These caches occur in the mound region of the Mississippi valley and generally throughout the Atlantic states. Very often they

are associated with burials in mounds, but in some cases they seem merely to have been buried in the ground or hidden among rocks. The largest deposit recorded contained upward of 8,000 flint disks (Moorehead), a few exceed 5,000, while those containing a smaller number are very numerous. It is probable that many of these caches of flaked stones are accumulations of incipient implements roughed out at the quarries and carried away for further specialization and use. But their occurrence with burials, the uniformity of their shape, and the absence of more than the most meager traces of their utilization as implements or for the making of implements, give rise to the conjecture that they were assembled and deposited for reasons dictated by superstition, that they were intended as memorials of important events, as monuments to departed chieftains, as provision for requirements in the future world, or as offerings to the mysterious powers or gods requiring this particular kind of sacrifice. If in the nature of a sacrifice they certainly fulfilled all re-



DISCOIDAL FLINT BLADE FROM
A CACHE OF 110 SPECIMENS;
ILLINOIS. (1-6)



CACHE OF LANCEOLATE FLINT BLADES

quirements, for only those familiar with such work can know the vast labor involved in quarrying the stone from the massive strata, in shaping the refractory material, and in transporting the product to far distant points. In the Hopewell mound in Ohio large numbers of beautiful blades of obsidian, obtained probably from Mexico, had been cast upon a sacrificial altar and partially destroyed by the great heat; usually, however, the deposits do not seem to have been subjected to the altar fires. See *Mines and Quarries*, *Problematical objects*, *Stone-work*.

Consult Holmes in 15th Rep. B. A. E., 1897; Moorehead (1) *Primitive Man in Ohio*, pp. 190, 192, 1892, (2) in *The Antiquarian*, I, 158, 1897; Seever, *ibid.*, 142; Smith, *ibid.*, 30; Snyder (1) in *Smithson. Rep.* 1876, 1877, (2) in *Proc. A. A. A. S.*,

XLII, 1894, (3) in *The Archaeologist*, I, no. 10, 1893, (4) *ibid.*, III, pp. 109-113, 1895; Squier and Davis in *Smithson. Cont.*, I, 1848; Wilson in *Nat. Mus. Rep.* 1897, 1899; and various brief notices in the archeological journals. (W. H. H.)

Cahokia Mound. The largest prehistoric artificial earthwork in the United States, situated in Madison co., Ill., in what is known as the American bottom, about 6 m. E. of St Louis, Mo., and in plain view of the railroads entering that city from the E. Before their partial destruction by the plow the principal mound was surrounded by an extensive mound group, numbering, according to Brackenridge (*Views La.*, 187, 1814), who visited the place in 1811, "45 mounds or pyramids, besides a great number of small artificial elevations." The name

Cahokia is that of a tribe which formerly occupied a neighboring village of the same name. In form the tumulus is a quadrangular pyramid with an apron, or terrace, extending from the S. side. The dimensions as given by McAdams (*Antiq. of Cahokia or Monk's Mound*, 2, 1883) are as follows:

The base N. and S., 998 ft.; E. to W., 721 ft.; height, 99 ft.; height of lower terrace, 30 ft.; outward extent of terrace about 200 ft.; width about 500 ft. The area of the base of the mound is estimated at about 16 acres. On the W. side, some 30 ft. above the first terrace, there was a second slight terrace, now scarcely distinguishable. Patrick, who studied the mound and its surroundings, and prepared a model which was cast in iron (now in the Peabody Museum at Cambridge, Mass.), represented a small level area or terrace some 3 or 4 ft. below the level top. Omitting the lower terrace and counting the diameters of the base as 721 and 798 ft., and the height as 99 ft., without regard to the upper level, the contents somewhat exceed 18,690,000 cu. ft. Adding the terrace, 3,000,000 cu. ft., the total contents amount to 21,690,000 cu. ft. The wall of Ft Ancient, Ohio, has been frequently referred to as one of the most extensive ancient works of the United States, yet the contents of the Cahokia



CAHOKIA MOUND, ILLINOIS; HEIGHT, AS MEASURED BY MCADAMS, 99 FT.; GREATEST LENGTH, 998 FT.

mound would form a wall of the same base and height exceeding 17 m. in length, or more than five times the length of the wall of Ft Ancient, and would have required, according to the usual method of calculation, the labor of 1,000 persons for $4\frac{3}{4}$ years, with the means that prehistoric Indians had at hand. The places from which the earth was taken are apparent from the depressions surrounding the Cahokia mound. In 1811, when visited by Brackenridge, the largest terrace was used by a colony of Trappists (whence sometimes the name Monk's Mound), who resided in several small cabins on one of the smaller mounds, which latter was cultivated as a kitchen garden. See Brackenridge, *op. cit.*; Bushnell, *Cahokia and Surrounding Mound Group*, Peabody Mus. Publ., 1904; Conant, *Footprints of Vanished Races*, 1879; McAdams (1) *Records of Ancient Races*, 1887, (2) *Antiquities of Cahokia, or Monk's Mound*, 1883. (C. T.)

Cones. Small prehistoric objects of polished stone, the use of which is undetermined, and they are therefore classed with problematical objects (q. v.). They are usually made of hematite or other hard material, and occur most plentifully in the states E. of the Mississippi. The base often varies somewhat from a circle, and the apex is sometimes quite low. Occasionally the specimens are truncated or abruptly sloped above or grade into hemispheres (q. v.), and there are doubly conical and egg forms which grade into the typical plummets (q. v.), the top in cases being truncated or slightly hollowed out, as if to accommodate some kind of fastening. Some of the cones approximate in form the more conical boat-stones (q. v.). It is surmised that they were carried as charms or served as a part of the "medicine" kit of the shaman. It is possible, however, that they were employed in playing some game. It is observed that kindred objects of hematite of more or less irregular shape show facets, such as would result from rubbing them down for the red color which they somewhat readily yield. Similar conical objects of hematite are used by the Pueblos of to-day and were used by the ancient tribes in making sacred paint; a tablet of sandstone or shale served as the grinding plate, and the cone, which was the muller, also yielded the paint. See *Hemispheres*.



CONE OF HEMATITE;
KENTUCKY. (1-3)

Cones are described and illustrated among others by Fowke (1) in 13th Rep. B. A. E., 1896, (2) Archæol. Hist. Ohio, 1902; Jones, Antiq. So. Inds., 1873; Moorehead, Prehist. Impls., 1900; Rau in Smithson. Cont., xxii, 6, 1872.

(W. H. H. G. F.)

Jasper. An impure, opaque form of chalcedony displaying various shades of color, the yellow, red, and brown hues predominating. When grayish or greenish and mottled with red the name bloodstone is sometimes applied. It was much used by the native tribes for flaked implements of several varieties, and more rarely for hammers, celts, axes, and ornaments. It occurs in irregular masses, or pockets, in connection with other formations in many sections of the United States, and was often obtained by the Indians in the form of fugitive pebbles and boulders; but in Pennsylvania, and perhaps in other states, it was quarried from the original beds. The best known quarries are in Bucks, Lehigh, and Berks cos., E. Pa. Jasper was extensively worked by the ancient inhabitants of Converse and neighboring counties of Wyoming, who found this material as well as the translucent varieties of chalcedony in connection with the quartzite of the region. See *Chalcedony*.

Consult Dorsey in Field Columb. Mus. Pub., Anthropol. ser., II, no. 4, 1900; Holmes in 15th Rep. B. A. E., 1897; Mercer in Am. Anthropol., VII, 80, 1894.

(W. H. H.)

Tnai.—Dall in Cont. N. A. Ethnol., I, 35, 1877.
Tnaina.—Wrangell in Baer and Helmersen, Beiträge, I, 103, 1839 (derived from *tnai*, 'man').
Tnaina Ttynai.—Bancroft, Nat. Races, I, 116, 1874.
True Thnaina.—Holmberg quoted by Dall, Alaska, 430, 1870.

Knakatnuk. A Knaiakhotana village and trading post of 35 natives in 1880 on the w. side of Knik bay, at the head of Cook inlet, Alaska.

Knakatnuk.—Petroff in 10th Census, Alaska, 29, 1884. **Knik Station.**—Post route map, 1903.

Knatsomita (*Knäts-o-mi'-ta*, 'all crazy dogs'). A society of the Ikunuhkahtsi, or All Comrades, in the Piegan tribe; it is composed of men about 40 years of age.—Grinnell, Blackfoot Lodge Tales, 221, 1892.

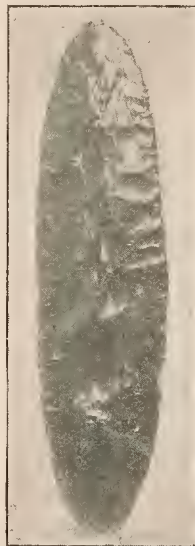
K'nick K'neck. See *Kinnikinnick*.

Knik (Eskimo: 'fire,' a name given by the Eskimo of Kodiak because, having no seaworthy boats of their own, they signaled for other tribes across the bay to send aid). A Knaiakhotana settlement of several villages on Knik r., at the head of Cook inlet, Alaska. The chief village had 46 people in 1880 (Petroff, 10th Census, Alaska, 29, 1884); in 1900 the population was 160 in 31 houses. This branch of the tribe numbers altogether between 200 and 300, who obtain their subsistence by hunting and trapping and by bartering with the Ahtena, who bring fur skins over the divide between Knik and Copper rs. every winter and stay weeks or months with the Knik, who through this trade obtain the clothing, utensils, and even luxuries of the whites. Their houses are built above ground of logs tightly calked with moss and covered with bark (11th Census, Alaska, 70, 1893). They use the birch-bark canoe on the inland rivers, but purchase skin bidarkas of the Kenai or Nikishka people to fish and travel along the coast.

Knik.—Petroff, 10th Census, Alaska, map, 1884.
Kinnick.—Petroff, *ibid.*, 39. **K'niq'-a-müt.**—Hoffman, Kadak MS., N. A. E., 1882.

Knives. Cutting tools are indispensable to primitive men, and the greatest ingenuity was exercised by the northern tribes in their manufacture. Every ma-

were artificially sharpened, and natural forms were modified to make them more effectual. The uses of the knife are innumerable; it served in war and was in-



OBSIDIAN CEREMONIAL
BLADE, 21 IN. LONG;
CALIFORNIA. (HOLMES)



OBSIDIAN KNIFE WITH HANDLE OF
OTTER SKIN, 7 1/4 IN. LONG;
CALIFORNIA. (MASON)

dispensable in every branch of the arts of life, in acquiring raw materials, in preparing them for use, and in shaping whatever was made. Knives served also



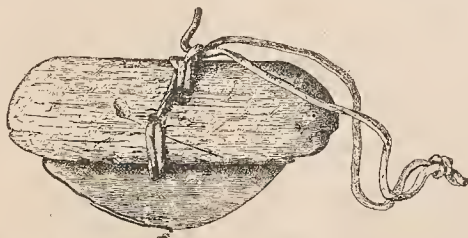
JASPER BLADE, 8 3/4 IN.
LONG; CALIFORNIA.
(WILSON)



FLINT BLADE WITH BEVELED
EDGE (1-2); OKLAHOMA. (HOLMES)



FLINT KNIFE WITH BEVELED
EDGE (1-2); TENNESSEE



WOMAN'S SLATE KNIFE (ULU); ESKIMO (1-4). (MURDOCH)

terial capable of taking and retaining an edge was utilized—wood, reed, bone, antler, shell, stone, and metal. Teeth are nature's cutting tools, and the teeth of animals (shark, beaver, etc.) were much employed by primitive men, as also were sharp bits of stone and splinters of wood and bone, the natural edges of which

in symbolism and ceremony, and one of the most cherished symbols of rank and authority was the great stone knife chipped with consummate skill from ob-

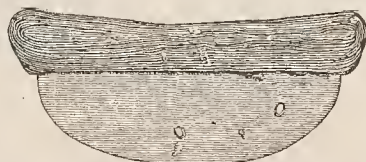
sidian or flint. According to Culin the stone knife is used among the Pueblos as a symbol of divinity, especially of the war gods, and is widely used in a healing ceremony called the "knife ceremony."



WOMAN'S SLATE KNIFE (1-4), ESKIMO.
(MURDOCH)

Differentiation of use combined with differences in material to give variety to the blade and its hafting; the so-called *ulu*, or woman's knife of the Eskimo, employed in various culinary arts, differs from

the man's knife, which is used in carving wood and for various other purposes (Mason); and the bone snow knife of the Arctic regions is a species by itself (Nelson). The copper knife is distinct from the stone knife, and the latter takes a multitude of forms, passing from the normal types in one direction into the club or mace, in another into the scraper, and in another into the dagger; and it blends with the arrowhead and the spearhead so fully that no definite line can be drawn between them save when the complete



IRON KNIFE WITH WOODEN HANDLE (1-6);
MAKAH



KNIFE OF NEPHRITE (1-6);
ESKIMO. (NELSON)



KNIFE WITH BONE HANDLE; CALIFORNIA.
(SMITH)

haft is in evidence. The flaked knife blade of flint is straight like a spearhead or is curved like a hook or sickle, and it is frequently beveled on one or both edges. The ceremonial knife is often of large size and great beauty. Certain

Tennessee flint blades, believed to this class, though very slender, measure upward of 2 ft in length, while beautiful red and black obsidian blades of California are hardly less noteworthy. Speaking of the latter, Powers says: have seen several which were 15



CEREMONIAL KNIFE, LENGTH 24 1-2 IN.; KWAKWITL. (BO)

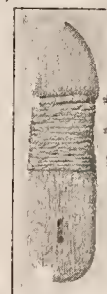
or more in length and about 2 1/2 in. w. in the widest part. Pieces as large as these are carried lifted in the hands the dance, wrapped with skin or cloth prevent the rough edges from lacerating the hands, but the smaller ones mounted in wooden handles and glued fast. The large ones can not be purchased at any price." See *Implements*.



COPPER KNIFE OR
DAGGER; HAIDA.
(NIBLACK)



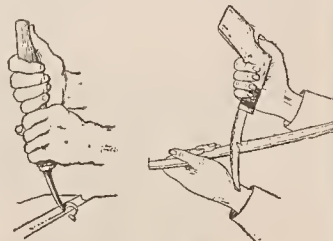
Two or three tribes of Indians, various clans, and so towns received their names from the knife, as Conshac ('reed knife'), a name for the Creeks; the town of Kusa among the Choctaw, and the Ntlakyapamuk of Thompson r., Brit. Col.



SLATE KNIFE WITH
WOODEN HANDLE (1-5); ESKIMO.
(MURDOCH)

Consult Boas (1) in 6th Rep. B. A. E., 1888, (2) in Nat. Mus. Rep. 1895, 1897; Fowke in 13th Rep. B. A. E., 1896; Goddard in Pub. Univ. of Cal., Anthropol. ser., 1, 1903; Holmes in Nat. Mus. Rep. 1901, 1903; Mason (1) in Rep. Nat. Mus. 1890, 1891 (2) *ibid.*, 1897, 1901; (3) *ibid.*, 1886, 1889; Moorehead, Prehist. Impl., 1900; Murdoch in 9th Rep. B. A. E., 1892; Nelson in 18th Rep. B. A. E., 1899; Niblack in Rep. Nat. Mus. 1888, 1890; Powers in Cont. N. A. Ethnol., III, 1877; Rau in Smithsonian Cont., XXII, 1876; Rust and Kroeber in Am. Anthropol., VII, 688, 1905; Thruston, Antiq. of Tenn., 1897; Wilson in Rep. Nat. Mus. 1897, 1899. (W. H. H.)

(2) in Nat. Mus. Rep. 1895, 1897; Fowke in 13th Rep. B. A. E., 1896; Goddard in Pub. Univ. of Cal., Anthropol. ser., 1, 1903; Holmes in Nat. Mus. Rep. 1901, 1903; Mason (1) in Rep. Nat. Mus. 1890, 1891 (2) *ibid.*, 1897, 1901; (3) *ibid.*, 1886, 1889; Moorehead, Prehist. Impl., 1900; Murdoch in 9th Rep. B. A. E., 1892; Nelson in 18th Rep. B. A. E., 1899; Niblack in Rep. Nat. Mus. 1888, 1890; Powers in Cont. N. A. Ethnol., III, 1877; Rau in Smithsonian Cont., XXII, 1876; Rust and Kroeber in Am. Anthropol., VII, 688, 1905; Thruston, Antiq. of Tenn., 1897; Wilson in Rep. Nat. Mus. 1897, 1899. (W. H. H.)



IRON CARVING KNIVES, ESKIMO. (MASON)

1876; Rust and Kroeber in Am. Anthropol., VII, 688, 1905; Thruston, Antiq. of Tenn., 1897; Wilson in Rep. Nat. Mus. 1897, 1899. (W. H. H.)

Knots. The Indians, and especially the Eskimo, whose difficulties with unfastening lines in a frozen area made them ingenious, tied for various purposes many

Munsee, but properly refers only to those of the tribe under Moravian teachers). **Moravins.**—Can. Ind. Aff., pt. 2, 65, 1906 (misprint).

Morbah (*Mor-bäh*). The Parrot clan of the Pecos people of N. Mex.—Hewett in Am. Anthropol., vi., 439, 1904.

Morbanas. A former tribe, probably Coahuiltecan, met in 1693 on the road from Coahuila to mission San Francisco, Texas.—Salinas (1693) in Dictamen Fiscal, Nov. 30, 1716, MS. cited by H. E. Bolton, inf'n, 1906.

Morongo. A reservation of 38,600 acres of fair land, unpatented, in Riverside co., s. Cal., occupied by 286 Mission Indians under Mission Tule River agency.—Ind. Aff. Rep., 175, 1902; *ibid.*, 192, 1905; Kelsey, Rep., 32, 1906.

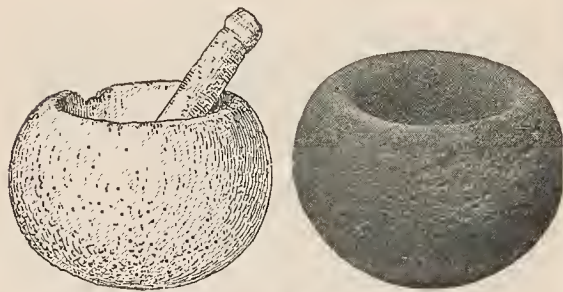
Mortars. Utensils employed by Indian tribes for the trituration of food and other substances. The Southwestern or Mexican type of grinding stone is known as a metate, and its operation consists in placing the substance to be treated, dry or moist, on the sloping upper surface of the slab and crushing and rubbing it with a flattish hand-stone until it is reduced to the required consistency or degree of fineness (see *Metates*, *Müllers*). This form of the utensil passes with many variations in size and shape into the typical mortar, a more or less deep receptacle in which the substance is pulverized if dry, or reduced to pulp if moist, by crushing with a pestle, which may be cylindrical, discoidal, globular, or bell-shaped. Mortars are made of stone, wood, bone (whale vertebrae), or improvised of rawhide or other substances depending on the region and the materials nearest at hand. The more primitive stone forms are boulders or other suitable pieces hol-



SIMPLE FORMS OF STONE MORTARS. *a* CALIFORNIA (1-8); *b*, RHODE ISLAND (1-8)

lowed out on the upper surface sufficiently to hold the material to be reduced, while the more highly specialized forms are tastefully shaped and carefully fin-

ished, the stone in some cases, as in s. California, being obtained by quarrying from the rock in place. California fur-



GLOBULAR STONE MORTARS FROM AURIFEROUS GRAVELS, CALIFORNIA. (HOLMES)

nishes the greatest variety of these utensils. In one district globular concretions were used: a segment of the shell was broken away and the softer interior removed, thus affording a deep symmetrical receptacle. In other localities cylindrical forms were worked out of lava or sandstone. In others still, the under surface was



ALASKAN MORTAR WITH SCULPTURED ORNAMENT; 1-12.

conveniently set in the ground. Ordinary mortars when in use are usually set in the ground to give them greater stability. The remarkable and handsome sandstone vessels and soapstone pots of s. California are not here classed as mortars. Occasionally the smaller mortars were embellished with engraved lines or sculptured to represent animal forms. Alaskan mortars, especially those of the Haida, are superior in this respect. An artistic mortar of this class, illustrated by Niblack, was used for pulverizing tobacco, and this is a type in very general use among the Northwestern tribes at the present time.

Perhaps the most remarkable mortars are those occurring frequently in the acorn-producing districts of the Pacific slope, where exposures of massive rock in place have worked in them groups of mortars, the conical receptacles numbering, in several observed cases, nearly a



YOKUTS WOMEN GRINDING SEED. (SANTA FE RAILROAD)

hundred. Some of the Western tribes set a conical basket, after removing its bottom, within the rim of the mortar bowl to serve as a hopper for retaining the meal.



GROUP OF MORTARS IN GRANITE SURFACE, CALIFORNIA (HOLMES)

Primitive forms of this utensil are the rawhide mortars used by the Plains tribes for pounding pemmican, the piece of rawhide being forced into a depression in the ground, forming a basin. Again, the hide was placed beneath the stone or wooden mortar to catch the particles that fell over. The rough basket-like receptacle of sticks set in the ground by the Yuman tribes of lower Colorado r. is probably the rudest known form of this utensil. In



STONE MORTAR WITH BASKET HOPPER; CALIFORNIA



HUPA MORTAR WITH BASKET HOPPERS. (MASON)

size stone mortars vary from that of the tiny paint cup found among the toilet articles of the warrior to the substantial basin holding several gallons. The larger ones, especially those excavated in rock masses, were probably often used for "stone-boiling." (See *Food*.)



SMALL PAINT MORTAR, HUPA; 1-7 (MASON)

The substances pulverized in mortars were the various minerals used for paint, potsherds and shells for tempering clay, etc., medicinal and ceremonial substances

of many kinds, including tobacco, and a wide range of food products, as maize, seeds, nuts, berries, roots, bark, dried meats, fish, grasshoppers, etc. A noteworthy group of paint mortars or plates, the use of which has heretofore been regarded as problematical, are described under the heading *Notched plates*. The wooden mortar was usually made of a short section of a log, hollowed out at one end and in some cases sharpened at the other for setting in the ground; but the receptacles were sometimes made in the side of a log or were cut out as individual utensils in basin or trough shape. The wooden mortar was in much more general use in districts where suitable stone was not available, as in Florida, in portions of the Mississippi valley, and on lower Colorado r. Among the remarkable



WOODEN MORTAR, COCOPA



WOODEN MORTAR, CHIPPEWA; 1-16. (HOFFMAN)

archeologic finds made by Cushing at Key Marco, Fla., are a number of small cup-like mortars with mallet-shaped pestles, handsomely formed and carefully finished.



ANCIENT WOODEN MORTAR, FLORIDA; 1-4. (CUSHING)



WOODEN MORTAR, IROQUOIS (LAFITAU)

Speaking of the Indians of Carolina Lawson says: "The savage men never beat their corn to make bread, but that is the women's work, especially the girls, to whom you shall see four beating with long great pestles in a narrow wooden mortar; and everyone keeps her stroke exactly that 'tis worthy of admiration."

Mortars are referred to by numerous writers, including Abbott (1) in *Surveys West of 100th Merid.*, vii, 1879, (2) *Prim. Indus.*, 1881; Cushing in *Proc. Am. Philos. Soc.*, xxxv, 153, 1896; Fowke, *Archæol. Hist. Ohio*, 1902; Hoffman in *14th Rep. B. A. E.*, 1896; Holmes in *Nat. Mus. Rep.* 1902, 1903; Jones, *Antiq. So. Inds.*, 1873; Lawson (1701), *Hist. Car.*, repr. 1860; MacCauley in *5th Rep. B. A. E.*, 1887; Meredith in Moorehead's *Prehist. Impls.*, 1900; Morgan, *League of Iroquois*, 1904; Niblack in *Rep. Nat. Mus.* 1888, 1890; Nordenskiöld, *Cliff Dwellers of the Mesa Verde*, 1893; Powers in *Cont. N. A. Ethnol.*, iii, 1877; Rau in *Smithson. Cont.*, xxii, 1876; Schoolcraft, *Ind. Tribes*, i, 1851; Thruston, *Antiq. of Tenn.*, 1897; Yates in Moorehead's *Prehist. Impls.*, 1900. (W. H. H.)

Mortuary customs. Yarrow (1st Rep. B. A. E., 1881) classifies Indian modes of burial as follows:

(1) Inhumation, (2) Embalment, (3) Deposition in urns, (4) Surface burial, (5) Cremation, (6) Aerial sepulture, (7) Aquatic burial. As the second relates to the preparation of the body, and the third, fourth, sixth, and seventh refer chiefly to the receptacles or the place of deposit, the disposal of the dead by the Indians may be classed under the heads *Burial* and *Cremation*.

The usual mode of burial among North American Indians has been by inhumation, or interment in pits, graves, or holes in the ground, in stone cists, in mounds, beneath or in cabins, wigwams, houses, or lodges, or in caves. As illustrations it may be stated that the Mohawk formerly made a large round hole in which the body was placed in a squatting posture, after which it was covered with timber and earth. Some of the Carolina tribes first placed the corpse in a cane hurdle and deposited it in an outhouse for a day; then it was taken out and wrapped in rush or cane matting, placed in a reed coffin, and deposited in a grave. Remains of this kind of wrapping have been found in some of the southern mounds, and in one case in a rock shelter. The bottom of the grave was sometimes covered with bark, on which the body was laid, and logs or slabs placed over it to prevent the earth from falling on the remains. An ancient form of burial in Tennessee, s. Illinois, at points on Delaware r., and among ancient pueblo dwellers in n. New Mexico, was in box-shape cists of rough stone slabs. Sepulchers of this kind have been found in mounds and cemeteries. In some instances they were placed in the same general direction, but in excavations made by the Bureau of American Ethnology it was found that these cists, as well as the uninclosed bodies in mounds, were gen-

erally placed without regard to uniformity of direction. When uniformity did occur, it was generally an indication of



STONE GRAVE, SHOWING ORDINARY CONSTRUCTION

a comparatively modern interment. The Creeks and the Seminole of Florida generally buried in a circular pit about 4 ft deep; the corpse, with a blanket or cloth wrapped about it, being placed in a sitting posture, the legs bent under and tied together. The sitting position in ancient burials has often been erroneously inferred from the bones occurring in a heap. It appears to have been a custom in the N. W., as well as in the E. and S. E., to remove the flesh by previous burial or otherwise, and then to bundle the bones and bury them, sometimes in communal pits. It was usual in grave burials to place the body in a horizontal position on its back, although the custom of placing on the side, often with the knees drawn up, was also practised; burial face downward, however, was rare. In addition to those mentioned, modes of burials in mounds varied. Sometimes a single body and sometimes several were placed in a wooden vault of upright timbers or of logs laid horizontally to form a pen. Dome-shaped stone vaults occur over a single sitting skeleton.



STONE GRAVE, TOP VIEW; ILLINOIS. (THOMAS)



STONE GRAVE WITH OFFSET ARCH, IOWA. (THOMAS)



ARCHED STONE GRAVE, OHIO. (THOMAS)



BURIAL UNDER HEAP OF STONES; HUDSON BAY ESKIMO. (TURNER)

Not infrequently the body was laid on the ground, slightly covered with earth, and over this a layer of plastic clay

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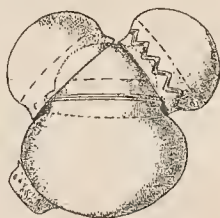
was spread on which was built a fire, forming an earthen shield over the corpse before additional earth was added. Caverns, fissures in rocks, rock shelters, etc., were frequently used as depositories for the dead. According to Yarrow, a cave near the House mts., Utah, in which the Gosiute Indians were in the habit of depositing their dead, was quite filled with human remains in 1872.

Embalmmnt and mummification were practised to a limited extent; the former chiefly in Virginia, the Carolinas, and



MUMMY FROM AN ALASKAN CAVE. (DALL)

Florida, and the latter in Alaska. Of the modes of disposing of the dead, included by Yarrow under "aerial sepulture," the following are examples: Burial in lodges, observed among the Sioux; these appear to have been exceptional and were merely an abandonment of the dead during an epidemic; a few cases of burial in lodges, however, have been observed in Alabama. Burial beneath the floor of the house and then at once burning the house were practised to some extent in E. Arkansas. Scaffold and tree burial was practised in Wisconsin, Minnesota, the Dakotas, Montana,



URN BURIAL ALABAMA MOUND; 1-22. (MOORE)



DAKOTA SCAFFOLD BURIAL. (YARROW)

etc., by the Chippewa, Sioux, Siksika, Mandan, Grosventres, Arapaho, and other Indians. The burial mounds of Wisconsin indicate this mode of disposing of the dead in former times, as the skeletons were buried after the removal of the flesh, and the bones frequently indicate long exposure to the air. The Eskimo of

the w. coast of Alaska sometimes place the dead on a platform 2 or 3 ft above ground and built over it a double roofing or tent, of driftwood. It was also the custom among the Indians of the La



DAKOTA TREE BURIAL. (YARROW)

region to have at certain periods what may be termed communal burials, in which the bodies or skeletons of a district were removed from their temporary



DAKOTA SCAFFOLD BURIAL. (YARROW)

burial places and deposited with much ceremony in a single large pit (see Brebeuf in Jes. Rel. for 1636, 128-139, 1858).

On the N. W. coast, N. of Columbia, the dead were usually placed in little cabin-

1858

Report 1908 09
Division of
Answer No.

Hematite. An iron ore much used by the native tribes for implements, ornaments, and small objects of problematical use. It is found in many parts of the country and in great abundance in the Iron Mountain district of Missouri and in the Marquette region of Michigan. It occurs as a massive ore, as nodules, and in other forms, distributed through rocks of various classes, and is usually dark in color, showing various shades of gray, brown, and red. The specular varieties are generally rather gray, and have a metallic luster. The red, earthy varieties, when compact, are known as red chalk, and when much disintegrated and pulverulent, as red ocher. They were, and are,

much used as paint by the aborigines, and small quantities, either in lumps or as powder, are commonly found in ancient graves, placed there for personal embellishment in the future existence. The highly siliceous varieties are often very hard, heavy, and tough, and make excellent implements. They were used especially in the manufacture of celts, axes, scrapers, etc., and for the rudely shaped hammers and sledges that served in mining work, as in the iron mines at Leslie, Mo. (Holmes). Many of the celts and celt-like implements are quite small, and in some cases probably served as amulets. Grooved axes of this material are of somewhat rare occurrence, but objects of problematical use, such as cones, hemispheres, and plummets, are common, and on account of their high finish, richness of color, and luster, are much prized by collectors. Hematite objects are found in mounds and on dwelling sites in the middle Mississippi valley region, in the Ohio valley, and extending into E. Kentucky and Tennessee to W. North Carolina, and to a limited extent in the S., in the Pueblo country, and on the Pacific coast. A small, well-shaped figure of this material, representing a bird, and neatly inlaid with turquoise and white shell, is among the collections obtained by Pepper from the Pueblo Bonito ruin, New Mexico. Hematite is not always readily distinguishable from limonite (which is generally yellowish or brownish in tint), and from some other forms of iron ore. See *Mines and Quarries*.

References to hematite objects are widely distributed throughout the literature of American archeology. Among others the following authors may be consulted: Douglass in Bull. Am. Mus. Nat. Hist., viii, 1896; Fewkes (1) in 17th Rep. B. A. E., 730, 1898, (2) in 21st Rep. B. A. E., 77, 1903; Fowke in 13th Rep. B. A. E., 1896; Holmes in Smithsonian Rep. 1903, 1904; Moorehead, Prehist. Impl., 1900; Pepper in Am. Anthropol., vii, 195, 1905.

(W. H. H.)

Hemispheres, Spheres. Small objects, usually of polished stone, the use of which has not been fully determined; they are therefore classed with problematical objects. The more typical forms, found in the mounds, are often of hematite and, like the cones, rarely exceed a few ounces in weight. Hemispheres are comparatively numerous, but spheres referable to this group are rare. Hammerstones and stones used as club-heads (see *Clubs, Hammers*) are often spherical, but usually

they are not well finished, and occasionally large cannonball-like stones are found which can not be properly classed with the smaller polished objects. The base of the hemispheres is flat, rarely slightly hollowed out, and varies from a circle to a decided ellipse, while the vertical section departs considerably from a true semicircle. Typical objects of this group are most plentiful in the middle Ohio valley. It is surmised that they served in playing some game, as talismans or charms, or for some special shamanistic purpose. According to Grinnell (inf'n, 1906) small balls of stone are still used by some Plains tribes in a game. Little girls roll them on the ice in winter, trying to move a small stick resting on the ice in front of the opposing party, perhaps 20 ft distant. If the stick is



HEMISPHERE OF HEMATITE; WEST VIRGINIA.
(1-3)

touched and moved, the side which rolls the ball may roll it again, and a point is counted. If the stick is not moved, the ball is rolled by one of the opposing party who endeavors to move the stick which

rests on the ice in front of her opponent. A small stone sphere was used by the Pima of Arizona in a kicked ball game, and numerous small spheres, usually of soft stone, are found in prehistoric ruins in Salt river valley of the same territory.

Consult Rau in *Smithson. Cont.*, XXII, 1877; Fowke (1) in *13th Rep. B. A. E.*, 1896, (2) *Archæol. Hist. Ohio*, 1902; Hrdlicka in *Am. Anthrop.*, VIII, no. 1, 1906; Moorehead, *Prehist. Impls.* 1900; Cushing in *Compte-rendu Internat. Cong. Am.*, VII, 178, 1890. (W. H. H.)

tribes to change the name of the family of the deceased, and to drop the name of the dead in whatever connection.

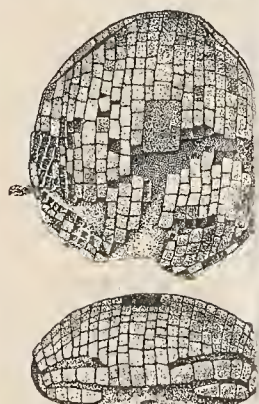
Consult Bancroft, *Native Races*, 1874; Dixon in *Bull. Am. Mus. Nat. Hist.*, xvii, pt. iii, 1905; Farrand, *Basis of Am. Hist.*, 1904; Holm, *Descr. New Sweden*, 1834; *Jesuit Relations*, Thwaites ed., i-lxxii, 1896-1901; Kroeber in *Bull. Am. Mus. Nat. Hist.*, xviii, pt. i, 1902; Owen, *Musquakie Folk-lore*, 1904; and the various reports of the B. A. E., especially the 1st Report, containing Yarrow's *Mortuary Customs of the N. A. Indians*, and authorities therein cited. See *Mourning, Religion, Urn Burial*. (C. T.)

Morzhovoi (Russian: 'walrus'). An Aleut village at the end of Alaska penin., Alaska, formerly at the head of Morzhovoi bay, now on the N. shore, on Traders cove, which opens into Isanotski bay. Pop. 45 in 1833 (according to Veniaminof), 68 in 1890.

Morshevoi.—Petroff in 10th Census, Alaska, 19, 1884. **Morshevschoje**.—Holmberg, *Ethnog. Skizz.*, map, 142, 1855. **Morzaivskoi**.—Elliott, *Cond. Aff. Alaska*, 225, 1875. **Morzhevskoe**.—Veniaminof, *Zapiski*, ii, 203, 1840. **Morzovoi**.—Post route map, 1903. **New Morzhovoi**.—Baker, *Geog. Dict. Alaska*, 1902. **Old Morzhovoi**.—Ibid. **Protasso**.—Petroff in 10th Census, Alaska, map, 1884 (strictly the name of the Greek church here). **Protassof**.—Ibid., 23. **Protassov**.—Petroff, *Rep. on Alaska*, 25, 1881.

✓ **Mosaic**. An art carried to high perfection among the more cultured aborigines of Mexico, where superb work was done, several examples of which enrich European museums. The art was but little in vogue N. of Mexico. Hopi women of to-day wear pendants made of small square or oblong wooden tablets upon which rude turquoise mosaics are set in black piñon gum. These are very inferior, however, to specimens recovered from ancient ruins in the Gila and Little Colorado valleys in Arizona, and in Chaco canyon, N. Mex., which consist of gorgets, ear pendants, and other objects, some of which are well preserved while others are represented only by the foundation form surrounded by clusters of settings loosened by decay of the matrix. Turquoise was the favorite material, but bits of shell and various bright-colored stones were also employed. The foundation form was of shell, wood, bone, and jet and other stone, and the matrix of gum or asphaltum. Although the work is neatly executed, the forms are simple and the designs not elaborate. One of the best examples, from the Little Colorado drainage in Arizona, is a pendant rudely representing a frog, the foundation of which is a bivalve shell, the matrix of pitch, and the settings of turquoise are arranged in lines conforming neatly to the shape of the creature, a bit of red jasper being set in the center of the back (Fewkes). Unfortunately the head of the frog has dis-

integrated. Among the specimens of laying obtained by the Hyde Expedition of the American Museum of Natural History, from Pueblo Bonito ruin, N. Mex., are a jet or lignite frog with turquoise eyes and neck-band, a scraper-like implement of deer bone with encircling ornamental bands in turquoise and jet, and a small bird of hematite tastefully set with turquoise and shell (Pepper).



ANCIENT MOSAIC FROG, ARIZONA
1-2. (FEWKES)

The ancient graves of s. California have yielded a number of specimens of rudimentary mosaic work in which bits of abalone



INCRUSTED OBJECTS FROM PUEBLO BONITO, NEW MEXICO; 1-4. (PEPPER)

shell are set in asphaltum and incrustation for handles of knives and for other objects (Abbott). It is also found in other sections of the country consisting chiefly of the insertion of bits of shell, bone, or stone separately in rows or in simple figures

in the margins of utensils, implements, masks, etc. (Niblack, Rust).

Consult Abbott in Surv. West of 100th Merid., VII, 1879; Fewkes (1) in Am. Anthrop., IX, no. 11, 1896, (2) in Smithsonian Rep. 1896, 1898, (3) in 22d Rep. B. A. E. 1903; Nelson in 18th Rep. B. A. E., 1899; Niblack in Rep. U. S. Nat. Mus. 1888, 1890; Pepper in Am. Anthrop., n. s., VII, no. 2, 1905; Rust in Am. Anthrop., n. s., VIII, no. 4, 1906. (W. H. H.)

Moshaich. The native name of the extinct Buffalo clans of Acoma and Sia pueblos, N. Mex.

Moshaich-hanog^{sh}.—Hodge in Am. Anthrop., IX, 349, 1896 (Acoma form; *hanogch* = 'people'). **Mushaich-hano.**—Ibid. (Sia form).

Moshoquen. A village or band apparently on or near the s. coast of Maine in 1616, and probably connected with the Abnaki confederacy. Mentioned by Smith (1616) in Mass. Hist. Soc. Coll., 3d s., VI, 107, 1837. (J. M.)

Moshulitubbee. See *Mushalatubbee*.

Mosilian. A division of the New Jersey Delawares formerly on the E. bank of

Iron. The use of iron by the American aborigines and especially by the tribes N. of Mexico was very limited as compared with their use of copper. The compact ores were sometimes used, and were flaked, pecked, or ground into shape, as were the harder varieties of stone. Implements, ornaments, and symbolic objects of hematite ore are found in great numbers in mounds and in burial places and on dwelling sites over a large part of the country. Since smelting was unknown to the natives, the only form of metallic iron available to them and sufficiently malleable to be shaped by hammering is of meteoric origin, and numerous examples of implements shaped from it have been recovered from the mounds. A series of celts of ordinary form, along with partly shaped pieces and natural masses of the metal, were found by Moorehead in a mound of the Hopewell group near Chillicothe, Ohio, and these are now in the Field Museum of Natural History, Chicago. The Turner mounds, in Hamilton co., Ohio, have perhaps yielded the most interesting relics of this class. Putnam describes these, in enumerating the various objects found on one of the earthen altars, as follows: "But by far the most important things found on this altar were the several masses of meteoric iron and the ornaments made from this metal. One of them is half of a spool-shaped ear ornament, like those made of copper with which it was associated. Another ear ornament of copper is covered with a thin plating of iron, in the same manner as others were covered with silver. Three of the masses of iron have been more or less hammered into bars, as if for the purpose of making some ornament or implement, and another is apparently in the natural shape in which it was found" (16th Rep. Peabody Museum, III, 171, 1884; see also Putnam in Proc. Am. Antiq. Soc., II, 349, 1883). Ross records the fact that the Eskimo of Smith sd. used meteoric iron. Small bits of this metal beaten out and set in a row in an ivory handle made effective knives. See *Hematite, Metal work.*

Consult Kroeber in Bull. Am. Mus. Nat. Hist., XII, 285, 1899; Ross, Voyage of Discovery, 1819; Thomas in 12th Rep. B. A. E., 319, 336, 1894. (W. H. H.)

Jet, Lignite, Anthracite, Cannel coal. Carbonaceous materials used to some extent by Indians. Jet of excellent quality occurs in Colorado, and the Indians of the arid region employ it for jewelry and various carvings. Good examples of lignite ornaments were obtained by Fewkes from the ancient ruins of Arizona, and of jet by Pepper from the ruins of Chaco canyon, N. Mex. Among the latter is a well-sculptured frog decorated with inlaid designs in turquoise and shell. Cannel-coal objects are found in the Ohio valley mounds, but few specimens carved from anthracite are known. A small, well-carved human head of jet-like stone was obtained by Smith from a shell heap on lower Frazer r., Brit. Col., and Niblack says that the N. W. coast tribes pulverize lignite and mix it with oil for paint.

Consult Fewkes in 22d Rep. B. A. E., 1903; Niblack in Rep. Nat. Mus. 1888, 1890; Pepper in Am. Anthropol., VII, 1905; Smith in Mem. Am. Mus. Nat. Hist., IV, 1903. (W. H. H.)

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Report 1908 09
Division of
Answer No.

The Star, Dec. 3, 1878

ANTIQUITY OF MAN

Prof. W. H. Holmes' Study of the
Problem in California.

RESULTS SOMEWHAT STARTLING

Upsets Long-Cherished Beliefs of
Many Prominent Scientists.

THE NEWEST FACTS

Among the eminent archaeologists of this country the genuineness of the famous "Calaveras Skull" as the cranium of one of a race of men existing millions of years ago is again the current subject of doubt and investigation.

In this connection also interrogative inquiry is busy with the alleged evidences of the antiquity of "Auriferous Gravel Man," and the conclusion may soon be formulated by authorities upon the subject that it is all a myth.

New and interesting scientific light is thrown upon the long-disputed points by investigations but just finished by Prof. William H. Holmes, the distinguished anthropologist and one of the head curators of the National Museum. Prof. Holmes occupies at present an entirely neutral position with regard to the matter, because he has not had time in which to study and consider the mass of data he has secured.

Authorized by Secretary Langley of the Smithsonian Museum, Prof. Holmes went to California in September last to study the problem of human antiquity, which has become somewhat knotty to scientists since the alleged finding of the "Calaveras skull" and certain fossil remains in Calaveras county, California, by the forty-niners digging in the earth for gold.

Prof. Holmes spent nearly two months at the work, and conducted it with all the care and precautions to be expected of him as one of the leading authorities in the domain of archaeology. He returned to the city recently and has furnished *The Star* the following account of his investigation and apparent conclusions. It makes one of the most important contributions to the literature of anthropology written in recent years, and may possibly lead to a revolution among the theories and beliefs upon the subject. It is:

The Human Race.

"For a generation past students of history have been breaking away from traditional notions of the age of the human race in the world. In Europe, it is conceded, there are traces of man in the glacial formations, carrying our history back a hundred thousand years or more, and in eastern North America much evidence has been adduced tending to show that this continent was occupied at least at the close of the glacial period, from ten to twenty thousand years ago. California has, however, put forth claims to still greater antiquity, and, as if determined to outdo the world in this, as in other things, claims to be the cradle of the race, par excellence. She is not satisfied with the 5,000 years of the orthodox chronology, the twenty thousand claimed for the Trenton man, nor yet the 100,000 or more conceded to the paleolithic man of England and the continent of Europe, but sets her figures for the

Homo sapiens of the high Sierra back so far that seven figures are necessary to express the time if years instead of ages are to be the unit.

"The story of the discoveries that lead to these astonishing conclusions is fascinating indeed, and the manner in which geology furnishes the chronological key must elicit the admiration even of the unscientific reader.

The First Discoverers.

"Soon after the hardihood of the forty-niners began to open up the great gold belt of the Sierra Nevada there filtered out into the outer world rumors of strange finds in the gravel beds from which the gold was washed. Reports of the discovery of fossil mammals, the mastodon, the rhinoceros, the horse, the camel and many other forms, and fossil plants, including petrified trees, and, finally, traces of man and his arts, were reported. The best known and most widely heralded find was that of a human cranium, known as the Calaveras skull, brought up from the depths of a mining shaft on Bald mountain, near Angel's Camp, Calaveras county. Other discoveries followed and included implements, utensils and ornaments of stone, the mortar and pestle occurring most frequently. Many of these objects came from the region of the Tuolumne Table mountain, and were reported to have been brought out by the miners from deep shafts beneath the lava beds that cap the mountain. There was, as a matter of course, little appreciation of the character and significance of these finds, for the men in that day were devoted, soul and body, to the search for gold; but the occurrence of human remains under flows of lava from volcanoes long since extinct was curious enough to excite some interest, and even then there were skeptics who said it could not be. The discoveries that followed are most humorously alluded to by Bret Harte, who in 'The Society Upon the Stanislaus' makes Truthful James 'tell in simple language what I know about the row that broke up our society upon the Stanislaus.'

Geological Research.

"These finds took on a more serious phase, when about 1860 Prof. J. D. Whitney, director of the state survey of California, took up the work of assembling and interpreting the evidence and Mr. C. D. Voy brought together a collection of the relics in San Francisco. The finds had been made by miners and mine superintendents, and Whitney visited these people, heard their stories and secured more or less valuable affidavits. He was convinced that the discoveries were genuine, and believed the evidence sufficient to establish the existence of a pliocene race in California. A long report was made, embodying the evidence and promulgating his beliefs. He was followed by others, and there was a pretty general acceptance of his conclusions among students of anthropology and scholars generally.

"But recent investigations have tended to increase rather than to diminish the age assigned to the gold-bearing formations. Their age has been made out in great detail by the able geologists of the United States geological survey, and the period of gravel depositions is shown to be a prolonged one, beginning far back in middle tertiary time and extending forward to the close of that vast period. Whitney believed all to be late tertiary or early post-tertiary, while many others have preferred to believe them of glacial age, and following the suggestions of their own beliefs and desires in the matter of human antiquity, have thought of the glacial age in the Sierras as probably later than that of the eastern side of the continent, thus bringing the geological chronology of man down toward that of the biblical chronology.

"Now, however, these delusions are finally dispelled by the researches of Lindgren, Turner and others, who tell us that the auriferous gravel man of California, if he really existed, was vastly older than even Whitney was willing to admit. The interest of the problem is thus greatly enhanced

and there is a very general desire to have the whole question thoroughly aired.

"Independently of the question of human origin and development thus associated with the history of the Sierra Nevada there is not a more fascinating chapter in the whole history of world building than that furnished by the orographic transformations now so closely made out by our geologists. The story may be told in a few words, and so simply as to convey an understanding of the methods of determining age and a realization of the vast time involved.

"The richest finds of gold made by the forty-niners were in the great valleys that cut their way down through mountains, plateaus and foot hills from the high ranges to the Sacramento valley. The gravel of the present river beds yielded much of the precious metal, but the richer deposits were in beds of gravel that outcropped in the sides of the valleys from one to two thousand feet above the river beds. These bodies of gravel were found to extend in attenuated bands far into the



Prof. W. H. Holmes.

mountains, and the rocky slopes were pierced by a thousand tunnels. The summits of the wildest mountains were honeycombed in the eager search for other leads.

"When the geologists finally appeared upon the scene the strange fact was developed that these deposits of gravels were of river formation, and that they really represented fossil rivers, the grandfathers and great grandfathers of the present rivers, which, in early tertiary times, had been clogged with gold-bearing gravel and then filled to the brim with volcanic materials. Lindgren and Turner have studied these remnants of past river systems, and have determined the course, declivity and age of the streams, and the miners have, in several cases, followed the sinuous courses of the channels entirely through the ranges, washing out the gold and leaving the gravel still in the tunneled channels, as a wood-worm pierces the oak, leaving only slight traces of his wonderful accomplishment. But what a remarkable succession of events this implies; what a vast time is involved and what an age is given to the races that pounded seeds or acorns in their mortars along the banks of those far-away ancestors of our modern rivers.

Work of Rivers.

The story they tell is about as follows: The tertiary rivers ran out across the high land pretty much as the streams of today find their way to the sea. They had strong currents, and scored down their slaty or

granitic walls and the gold-bearing quartz seams intersecting them, and filled their beds with the debris. The freed gold sank to the bottoms and the coarse water-worn materials accumulated to the thickness of hundreds of feet.

"It is upon the banks of these rivers that the race must have lived that left its bones and its tools and utensils imbedded along with the bodies of the giant mammals of their time. Then came a change over these scenes—a profound and wonderful change; a period of great volcanic activity followed, and lavas flowed and streams of mud descended, until the valleys were filled up and new channels, system after system, were formed. At the close of a vast period of these activities the deepest valleys were filled up to overflowing, and when the flows of basalt, the final products, ceased the waters of the Sierra had to begin anew the cutting of thoroughfares to the Pacific. This volcanic period continued through a large part of the tertiary age—a period not to be estimated in thousands, but in hundreds of thousands of years.

"But behold the changes that have since taken place! These streams—the Marced, the Tuolumne, the Stanislaus, the American river, the Yuba and others—have cut their way by the slow processes of erosion down deep into the bowels of the earth, and now run their courses in valleys 2,000 feet deep and many miles in width, so profound, precipitous and inaccessible that it is a day's journey to cross them, where indeed they can be crossed at all by human feet.

"The traveler who descends into one of these great canons and painfully works his way up the opposite side to the crests, where the miners are tunneling the river beds of former periods, finds himself soliloquizing in the following vein: 'Is it possible that man can have dwelt in this wild land so long as this, while these mountains were carved out and the vast valleys formed by the tedious sculpture of the mountain streams? It, indeed, surpasses belief, and unless the most weighty evidence is forthcoming, the whole story of auriferous gravel man must fall.'

"But this is not all the geologist has to tell of the flight of time. When the valleys had been deepened nearly to their present beds the glacial period came on, and the ice reshaped them and modeled the marvelous contours of which Yosemite is a fine type. From the point of view of the man of the old river systems the glacial period is recent time, but this is the period of the paleolithic man of New Jersey and Ohio, if such there was, and the glacial man of Europe had not, even at this late date, reached the status of culture attained by his California precursor a million years before, if such a precursor there ever was.

Table Mountain.

"This panoramic sketch is not well calculated to give an idea of the magnitude of the geographical features with which we have to deal, but it may serve to show something of the geological relations. Table mountain, A, is a long narrow table land extending outward toward the west between two valleys from 1,500 to 2,000 feet deep. The summit of the mountain is sinuous as a serpent, for it is the stream of lava that flowed into the bed of the ancient river whose gravelly, gold-bearing bed is seen in the section at B. The streams cut their channels at the sides because the lava was harder than the neighboring formations, and what was originally the valley is now the mountain crest. The dotted lines in the section show how the tunnels pierce the sides of the mountain and reach the main channel of the old stream in the heart of the mountain, and it is from these deep diggings under Table mountain that many of the human relics are said to have been brought forth. At C we have the undisturbed formations of the mountain. At B is Tuttletown, where still lives 'Truthful James.' To the left is the profound Valley of the Stanislaus, and beyond this, and twenty miles away, at C, is Bald mountain, where, in a deep tunnel in formations corresponding to those of Table mountain, the Calaveras skull was found.

"Stranger than all are some of the facts



of that eventful time. Many have a more or less definite knowledge of the finding of the Calaveras skull, some from actual knowledge of the circumstances, some from hearsay, and it is a noteworthy fact that nearly all of them agree that the story of the finding of the skull is a 'fake.'

Joke on a Scientist.

"One of these men, now occupying a position of honor in the community, laughed heartily when the subject of the ancient skull was referred to. 'I was in Angels at the time,' said he in substance, 'and can tell you all about it. The boys of those days were given to an inordinate love for "joshing," and, under the leadership of J. C. Serlbiner, many practical jokes were perpetrated. Why, I had that skull, with the mate to it, in my store for weeks before the scheme of making sport out of it was thought of. They were brought to me by J. I. Boone from a burial place at Salt Springs, twelve miles west of Angels. Serlbiner got hold of one of these skulls friend Mattison, who had a mine on Bald mountain near by. It was finally planted in the bottom of the mine and duly discovered by Mattison's workmen. Then the conspirators, not getting much satisfaction out of Mattison, carried it to Dr. Jones, at Murphy's, who was the leading physician of the section, and a great collector of curiosities. He took it in, but later, finding cobwebs inside of it, threw it into the street; but, relenting, took it up again and resolved to give it a show; and this was done when Prof. Whitney came along. It was shown to him and the story of the finding told him. He took a deep interest in it, as a matter of course, and departed at once to find Mattison, from whom he secured the affidavit as to the circumstances of its discovery. All were delighted to have the joke on Whitney, who, being an easterner of very reserved demeanor, was unpopular with the miners. So the story began, and that is all there is in the business.'

"Other versions were heard and a few individuals were found who doubt the story of deception and say the old men of Angels are still given to 'joshing.' These stories, however, do not seriously affect the evidence found in Table mountain and elsewhere, but they serve to indicate the difficulties that surround a proper investigation of the subject, and it is only by a most painstaking gathering and sifting of the various strands of evidence that a solid basis of fact can be reached.

"As the question stands today the very imposing group of facts and observations arrayed to support the theory of great antiquity of man in California is compelled to meet objections so strong that they may not be able to withstand the onslaught of skepticism."

encountered when we come to consider the physical characteristics and culture of auriferous gravel man. The human creature of a period so remote might be expected to betray some characteristics suggestive of his connection with the lower forms, for the race of mammals was then young, but the Calaveras skull, about which such a marvelous chapter in history has been constructed, belonged to a man quite equal to the average man of today in craniological development, and the evolutionist, if we accept the antiquity of the specimen, must receive a shock from this fact quite as stunning as does the ordinary descendant of Adam and Eve. Perhaps, as Bret Harte, poet, giving thee an air that's somewhat in addressing this skull, forcibly suggests—

"The professor slightly antedated by some thousand years thy advent on this better fitted for cold-blooded creatures."

"Perhaps the most striking feature of this strange story of early tertiary humanity is that the traces of his activities, so plentifully brought to light, indicate not that he was struggling with the beginnings of the most elementary arts, as we might reasonably expect, but that he had reached the ripe state of culture known as neolithic, and ground his acorns in well-rounded and neatly decorated stone mortars, with symmetric, artistically shaped pestles, shaped fine obsidian blades for use in the chase, decorated his person with well-wrought beads and employed fancifully shaped stones of various kinds in his arts or ceremonies. Along with these things went, no doubt, the appropriate accompaniments of advanced society, institutions and customs, and when we come to compare these varied objects with the tools and utensils of the tribes of men now living in California we are forcibly struck with the resemblances, and, indeed, in many cases with the absolute identity of the forms. This again caused the cautious investigator to pause and ask, 'Is it not possible that some mistake has been made and that auriferous gravel man is a myth?' But we turn to the evidence, to the writings of Whitney, Becker and others and to the statements of many miners and mining people, and are compelled to acknowledge its force.

The Affidavits.

"Mr. Thomas Matteson found the Calaveras skull in his shaft on Bald mountain at the depth of 125 feet, and the following affidavit is furnished by Professor Whitney, who took the trouble to visit the mine and secure it:

"SAN ANDREAS, Calaveras county, Cal.,
January 3, 1874.

"This is to certify that I, the undersigned, did, about the year 1858, dig out of some mining claims known as the Stanislaus Company, situated in Table mountain, Tuolumne county, opposite O'Byrn's Ferry, on the Stanislaus river, a stone hatchet, similar in shape to this (here is inscribed a rough drawing of a cutting implement of a triangular shape) with a hole through it for a handle, near the middle. Its size was four inches across the edge, and length about six inches. It had evidently been made by human hands. The above relic was found from sixty to seventy-five feet from the surface gravel, under the basalt and about 300 feet in from the mouth of the tunnel. There were also some stone mortars found at about the same time and place and at various times where there were also found numerous fossil bones of different animals, and fossil wood.

"(Signed) JOHN CAROM.

"Subscribed and sworn to before me,

"WM. O. SWANSON, Justice of Peace,
Calaveras county, Cal.

"And, again, there is the sworn statement of Mr. J. H. Neale of Sonora, given by Dr. Becker:

"SENORA, August 2 1890.

"In 1877 Mr. J. H. Neale was superintendent of the Montezuma Tunnel Company and ran the Montezuma tunnel into the gravel underlying the lava of Table mountain, Tuolumne county. The mouth of the tunnel is near the road which leads in a southerly direction from Rawhide camp, and about three miles from that place. The mouth is approximately 1,200 feet from the present edge of the solid lava cap of the mountain. The course of the tunnel is a little north of east.

"At a distance of 1,400 and 1,500 feet from the mouth of the tunnel or of between 200 and 300 feet beyond the edge of the solid lava, Mr. Neale saw several spear heads, of some dark rock and nearly one foot in length. On exploring further, he himself found a small mortar three or four inches in diameter and of irregular shape. This was discovered within a foot or two of spear heads. He then found a large, well-formed pestle, now the property of Dr. R. L. Bromley, and near by a large and very irregular mortar, also at present the property of Dr. Bromley.

"All of these relics were found the same afternoon, and were within a few feet of one another and close to the bed rock, perhaps within one foot of it."

"Mr. Neale declares it utterly impossible that these relics can have reached the position in which they were found excepting at the time the gravel was deposited, and before the lava cap formed. There was not the slightest trace of any disturbance of the mass of any natural fissure into it by which access could have been obtained, either there or in the neighborhood.

"And Mr. J. H. Neale declares upon his oath that the foregoing statement is in every respect true.

"(Signed.)

JOHN H. NEALE,

"Subscribed and sworn to before me this second day of August, 1890.

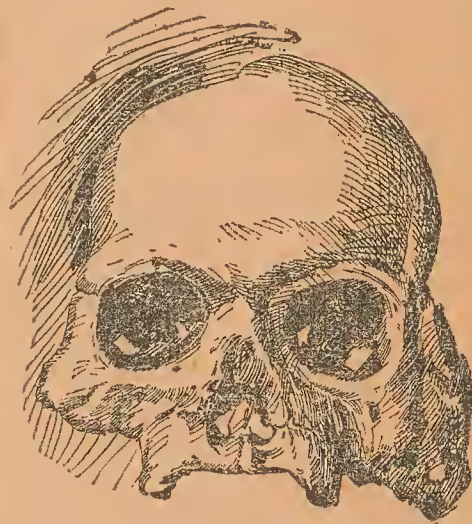
"(Signed.)

EDWIN A. ROGERS,

"Notary Public.

"And still more authoritative than these is the find by Mr. Clarence King of a pestle, well-shaped, though fragmental, in the old gravels underlying the lava cap of Table mountain.

"When we consider the amount of this



The Calaveras Skull.

evidence and the apparent association of the remains and relics with the remains of extinct animals, and supplement these statements by the statement that such men as Whitney, King and Becker consider the accumulated data sufficient to satisfy them, all must allow that there is evidence, and evidence, too, worthy of serious consideration.

A Visit to Table Mountain.

"A visit to the auriferous region has a fascinating interest to the geologist and student of human history. The ground is made classic in science and in song, and the story of the gold hunters, and especially the gold finders, of '49 is unequalled in the realms of romance. But a look into the deserted shafts of Table mountain and a visit to the few surviving members of the Society on the Stanislaus afford little aid to the student, for the observations, preserved in tradition and recorded in books, cannot be made over again. But it is a great satisfaction to read the geologic story on the spot and a pleasure indeed to interview the sturdy men whose lives span the whole recorded history of the golden age of California.

"Angel's Camp, which was the site of the first discovery of auriferous man, is still a typical mining town, and here, and at Murphy's near by, are to be found a score or more of sturdy forty-niners who have vivid recollections of the early days and take great pleasure in recounting the event.

RANDOM RECORDS OF A LIFETIME
DEVOTED TO SCIENCE AND ART, 1846-1931

BY W. H. HOLMES

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